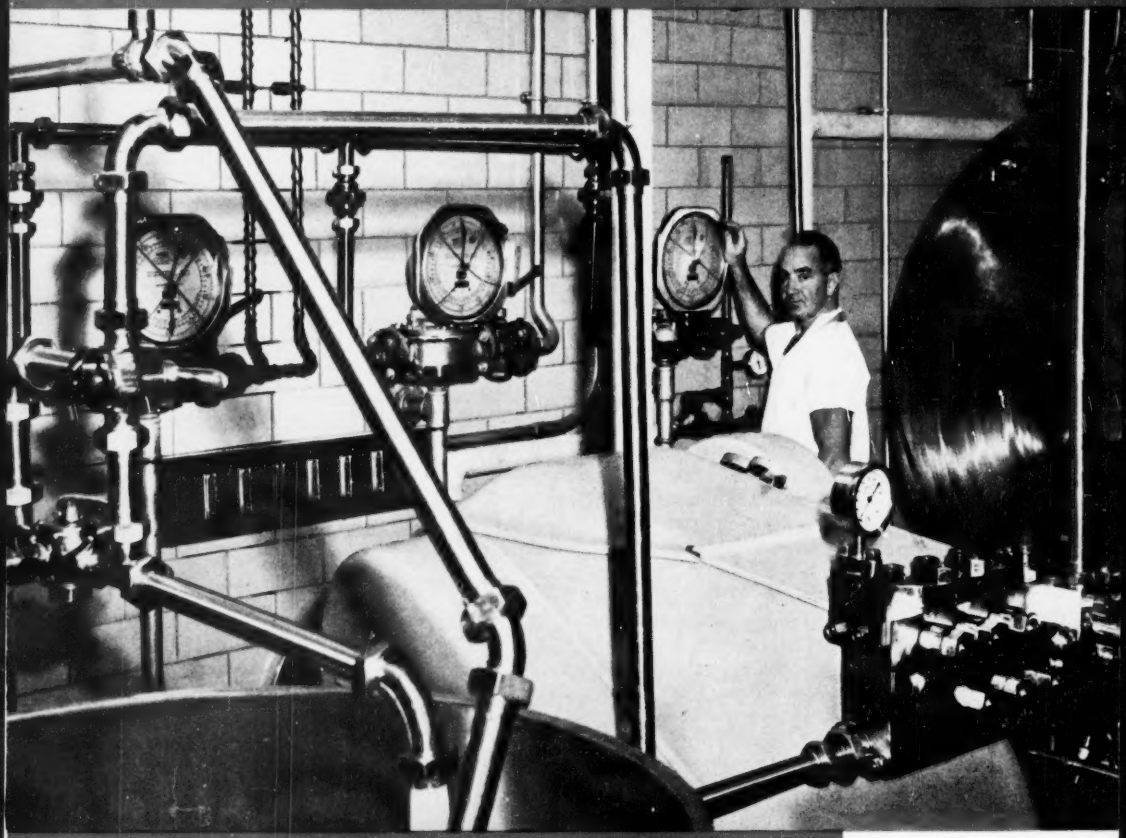
FOOD ENGINEERING

October 1951

A McGRAW-HILL PUBLICATION • FORMERLY FOOD INDUSTRIES

85 CENTS



Batch-scaling reduced as First National homogenizes most bread ingredients, then meters emulsion to mixer. (Page 67)

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NEW EQUIPMENT

—For Higher Efficiency Output, Quality

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PROVED IN PERFORMANCE

Grinnell-Saunders Valves with CHEMICALLY INERT KEL-F* DIAPHRAGMS

Pat. App. for

Grinnell-Saunders Diaphragm Valves with KEL-F Diaphragms are living up to every promise made for them! At the right are reports from typical users.

KEL-F's resistance to chemical action, low cold flow, wide range of temperature application and exceptional flex life combine to make it the most important diaphragm development in years. KEL-F is chemically inert to all organic acids and alkalies in all concentrations. It withstands chlorinated aliphatic and aromatic compounds, concentrated nitric, chromic, hydrofluoric and sulphuric acids and most solvents which readily attack rubber and previous synthetic diaphragm materials.

While KEL-F is tough and flexible, it is not resilient. To provide resiliency for proper closure of the valve and to provide added support for the KEL-F diaphragm, it is backed with a rubber cushion. A free-floating method of attachment to the compressor assures an even closing pressure on the entire surface of the weir. A tube nut which floats as the rubber cushion presses down in closing the valve, eliminates excessive pressure on the diaphragm stud. The rubber cushions the closing force, thereby reducing wear and cutting action on the diaphragm. In accelerated tests, a 2-inch valve with a KEL-F diaphragm withstood over 80,000 closures, drop tight, against 80 pounds of air under water with no leakage and no visible signs of wear. Write for complete information.

Typical performance reports . . .

1. Chlorine and HCl gas with small amounts of acetic acid and acetyl chloride at 302° F. for 900 hours. Very much superior to material it replaced.

2. Mixed aromatic and ketone solvents at 230° F. and 10 psi for three months. No sign of deterioration.

3. Chlorinated organic chemical at 158 to 194° F. and 30 to 40 psi for nine months. No failure, no shutdown, no replacement.

4. Chromyl chloride at ambient temperature and 15 psi. Diaphragm condition good at end of thirty days' test.

5. Liquid chloral saturated with HCl at 158° F. for 408 hours. Well satisfied — have placed orders for additional diaphragms.

*"KEL-F" is the registered trade name for polytrifluorochlorethylene, an exceptionally stable thermoplastic. It is produced by the M. W. Kellogg Co.

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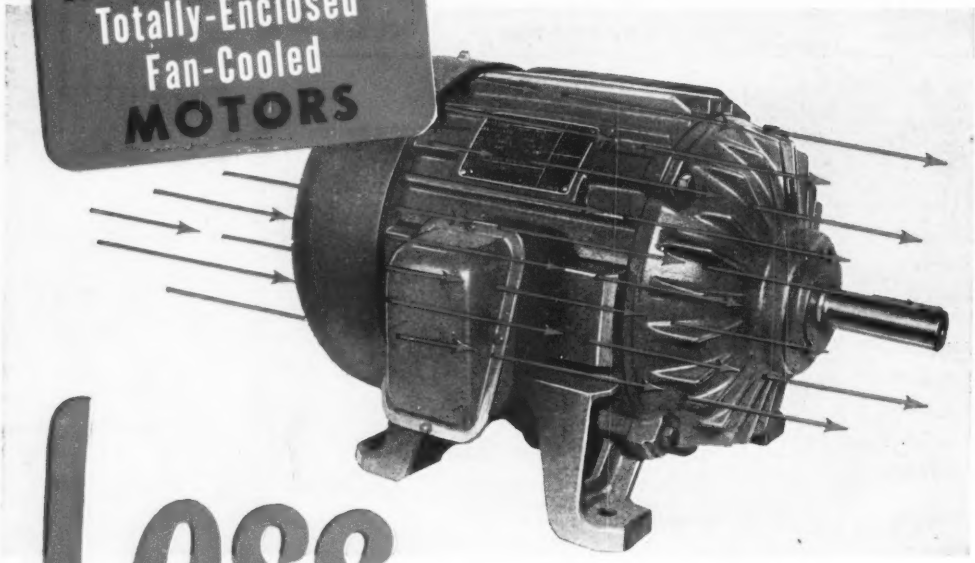
Totally-Enclosed
Fan-Cooled
MOTORS



Less MOTOR CLEANING ...INSPECTION...OVERHAUL!

HERE'S A MOTOR that actually blows itself clean! Dirt is carried away by cooling air blown over the ribbed cast iron frame and bearing housings of this new Allis-Chalmers tefc motor.

Dirt can't build up to cause overheating. Concealed air passages and pockets have been eliminated. Even oily dirt that sticks can simply be wiped or blown off.

And this means savings! Maintenance costs are traditionally low on totally-enclosed, fan-cooled motors. But they're lower than ever before on the new Allis-Chalmers Type APZ tefc motor.

Rigid Construction

The frame is cast iron which has high resistance against corrosion and distortion. Bearings are pre-lubricated at the factory and should need no attention for years. Tapped holes with pipe plugs to permit regreasing and to provide grease relief are standard equipment.

Get All The Facts

The new Allis-Chalmers Type APZ totally-enclosed, fan-cooled motor is built in all NEMA standard frame sizes from 224* to 505. Also in explosion-proof type. Your A-C Authorized Distributor or District Office has complete information. Call today, or write Allis-Chalmers, Milwaukee 1, Wisconsin. Ask for Bulletin 51B7225. A-3426

Sold . . .
Applied . . .
Serviced . . .

by Allis-Chalmers Authorized Dealers, Certified Service Shops and Sales Offices throughout the country.

CONTROL — Manual, magnetic and combination starters; push button stations and components for complete control systems.

TEXROPE — Belts in all sizes and sections, standard and *Vari-Pitch* sheaves, speed changers.

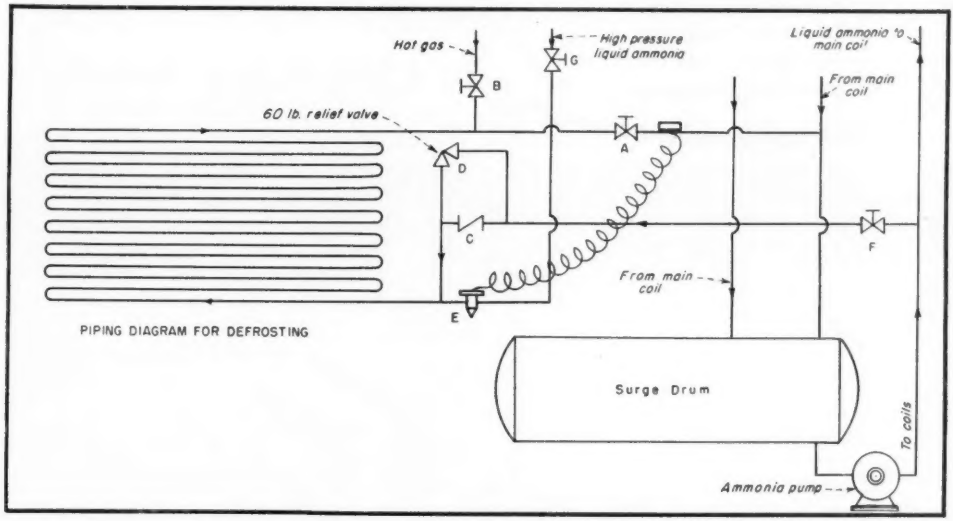
PUMPS — Integral motor and coupled types from ¾ in. to 72 in. discharge and up.

Texrope and Vari-Pitch are Allis-Chalmers trademarks.

ALLIS-CHALMERS

*Similar design non-ventilated motors Type APK, also available in frames 203 to 224 inclusive.

PRACTICAL IDEAS



Frost-Coil Added, Output Upped

Freezer capacity has been increased at J. H. Dulany & Sons, Inc., Exmore, Va., merely by adding a separate frost-collecting coil ahead of the main cooling coil. This coil has made it unnecessary to shut down for defrosting during unscheduled periods. Also avoided are slowdowns due to frost accumulation on the main coil.

The products—peas, beans, cut asparagus and cut rhubarb, etc.—are flumed to the station, where freezer trays are loaded. Though they pass through two dewatering reels, these products nevertheless retain a considerable amount of loose moisture as they enter the freezer.

When this moisture was deposited as frost on the main refrigerated coil, freezing rate dropped sharply, accompanied by reduced freezer output. Therefore it was frequently necessary to halt processing for unscheduled defrosting.

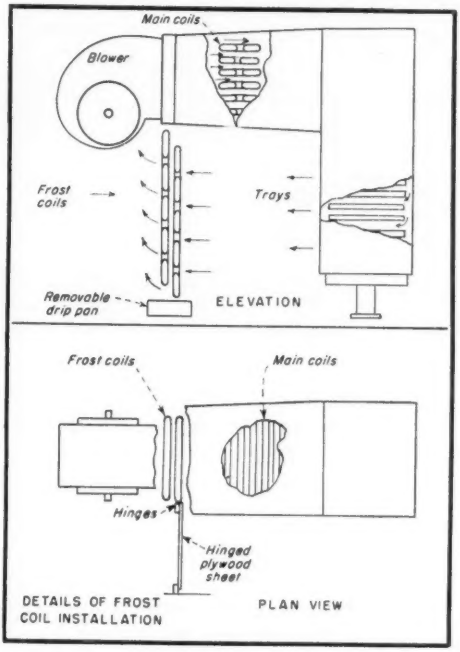
After installing a separate moisture pick-up, or frost-gathering coil (see drawing), slow-down and shut-down problems vanished.

Now, cold-blast air, driven by blower through primary coils, passes down through loaded trays and returns to the fan only after passing through secondary coils. Moisture absorbed from the trays is deposited as frost on the latter coil, which must be de-iced when excessive snow is accumulated to prevent frost building up on the primary coil.

However, defrosting of the secondary coil is easily done in 5 min. without interrupting freezing operation. Hinged to one side of the coils is a plywood sheet. During normal operation this plywood "door" closes the space between the secondary coil and the wall of the freezer, thus directing the blast from the trays through the frost-collecting coils. During defrosting, the door is swung in front of secondary coils, shunting air blast around instead of through them.

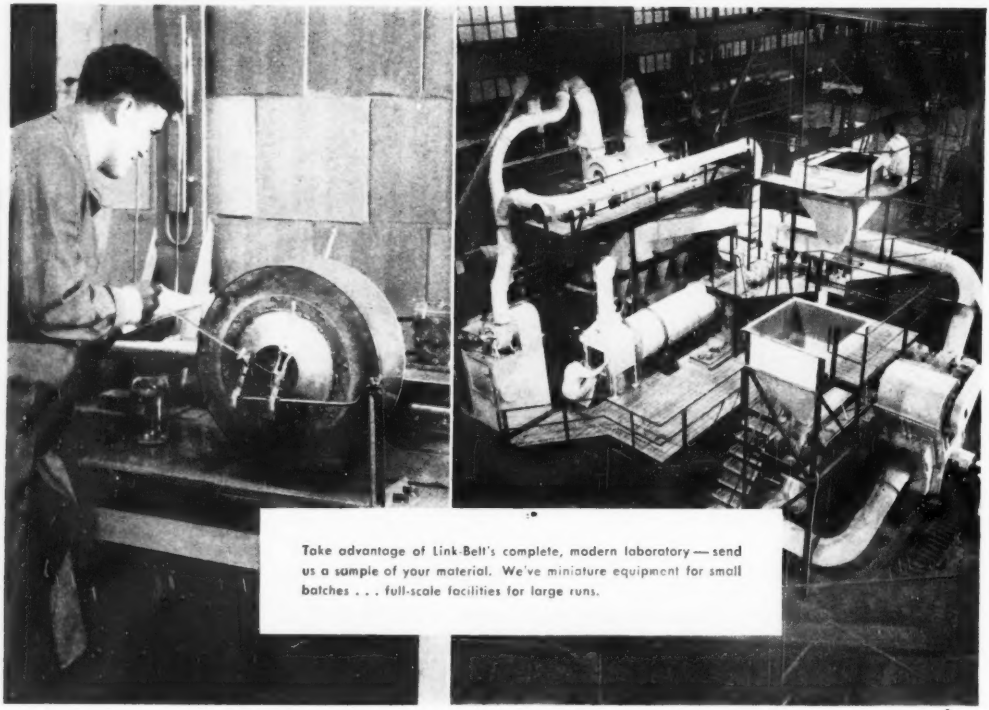
When door is in place in front of coils, suction valve (A in drawing) is closed and hot gas valve (B) opened. Pressure then closes check vale (C) in the line from the ammonia pump. Pressure continues to build up until 60 lb. relief valve (D) opens, and discharges liquid ammonia from coils to pump discharge line. After about 5 min., during which time the coil is completely defrosted, hot gas valve (B) is closed and valve (A) opened. Then the plywood door is swung back to former position and the frost-collecting cycle repeated.

To avoid frozen drains, a pan is placed under the secondary coil during defrosting. Drip from melted frost, collected in this trough, is removed after liquid ammonia is recirculated in the secondary coil.



AN INVITATION
to manufacturers with drying, cooling or roasting problems...

LINK-BELT will test a pound or a ton of your material



Take advantage of Link-Belt's complete, modern laboratory — send us a sample of your material. We've miniature equipment for small batches . . . full-scale facilities for large runs.

Whatever size the sample, we will test-run your material, work out procedures in this laboratory that can be duplicated in your plant

If your production has been delayed or handicapped by drying, cooling, or roasting obstacles, there's an easy, no-obligation way you can get an immediate answer . . .

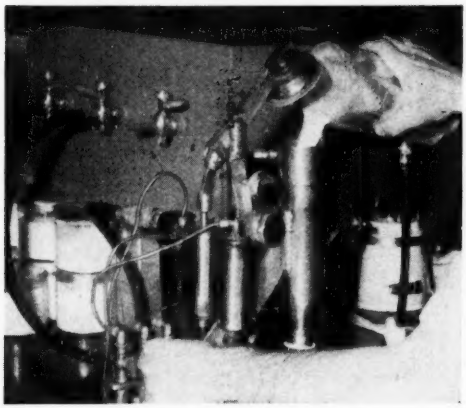
Follow the lead of hundreds of others who have utilized Link-Belt's scientific laboratory to test-run their materials. As a result of this testing and research, scores of different materials are now being processed by Link-Belt Dryers installed all over the world.

And here's an added Link-Belt service — if you can't ship samples, we'll put a unit on loan right in your own plant. Find out how you can put these Link-Belt services, plus Link-Belt experience, to work for you. Call the Link-Belt plant or office nearest you.

LINK-BELT COMPANY: Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8, Springs (South Africa). Offices in principal cities. 12.424

One other attachment has been helpful in obtaining maximum efficiency for this system: An additional expansion valve (E) has been connected in the high-pressure liquid ammonia line. During week-ends, valve (F) is closed and valve (G) opened. By this method the freezer is safely maintained at starting temperature, throughout the shut-down-period.

Although system requires some extra work by the operator, freezer capacity has been increased and production is no longer interrupted.—*R. P. Godfrey, Davis Wharf, Va.*



Sediment Test Time Cut 90%

By designing and building a special unit to assist in making standard laboratory sediment tests we have cut time to less than one-tenth that formerly required.

We are a large milk products manufacturer, and accordingly we run numerous tests in our quality control laboratory. In recent years the frequency has increased due to the large variety of new products processed. We conduct about 200 sediment tests daily.

Most laboratory technicians are well aware of the tedious work involved in such tests. Each filtration operation takes a minimum of 5 min., during which time air must be forced through the filter by a hand-squeezed pump.

Our home-built unit, however, cuts the time for this operation down to 30 sec. Hence, these duties that formerly required the full-time services of two laboratory workers now are accomplished by one individual in 2 hr.

The device we built is essentially a specialized, air-operated, quick-filtering unit. We use a cylinder large enough to hold 250 c.c. of milk, allowing sufficient space above for compressed air, piped at the side of the cylinder.

The bottom of the cylinder is dimensioned so that the filter container can be fitted into it. A tight seal must be formed between the lips of the container and the bottom circumference of the cylinder.

Filter paper is placed in its retainer, which in turn is inserted in the bottom of the cylinder to be held firmly in position by air pressure on a lever arm operated by an air cylinder and piston.

The top of the cylinder is faced so that a tight closure can be maintained when the cover is in place. This cover is likewise secured by air pressure.

Near the top of the cylinder is attached the pipe for the compressed air—admitted at 50 psi. to the cylinder. This air flow, controlled by a petcock, provides the pressure to rapidly force the milk through the filter. When filtration is completed, the large volume of 50-psi. air passing through quickly dries the filter pad.—*Don Tupper, Chief Engineer, Rochester Dairy Cooperative, Rochester, Minn.*

$50 EXTRA FOR BEST ITEM

You are invited to submit Practical Ideas. You will be paid at regular rates when your item is printed and if it is judged best for the month you will get an additional payment of $50.

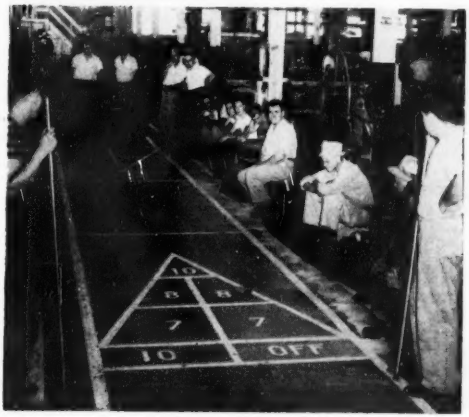
Selection of the best contributed item will be made by a group of 200 readers each month, and the item title and author's name will be cited (see below).

Practical Ideas may describe any type of device or method recently developed to solve a problem, speed an operation, or make some task easier. They may concern factory, laboratory, warehouse, or power-plant operations in the food industry. Ideas on management, maintenance, and trucking or shipping also are suitable.

You need not be an experienced writer or draftsman to submit these ideas. The text will be edited and sketches converted to finished drawings.

Send your items to: Practical Ideas Editor, FOOD ENGINEERING, 330 W. 42nd St., New York 18, N. Y.

AUGUST PRACTICAL IDEA votes best was "Steam-and-Water Mixer Made of Scrap," submitted by F. C. Beavan, Victoria, Australia. Described was an easily built device which, by silently and dependably mixing water and live-steam, provides an instant source of hot water anywhere in the plant.



Aisle Game Areas Up Worker Morale

At the cost of a can of paint, simple and inexpensive equipment, and an occasional sack of corn meal, almost any plant can have a game area—one that will hold general employee interest and stimulate good group morale.

For the area, itself, there is only needed a 50-ft. length of concrete aisle or hard wood floor—readily found in most food plants.

This is the way the idea developed here at Cambridge Wire Cloth Co., Cambridge, Md.:

Our first attempt to provide noon-hour recreation facilities was the installation of horseshoe pitching ranges. But popularity of this game proved limited, and the galleries were small. Moreover, inclement weather halted the pitching, and there was no alternative game activity.

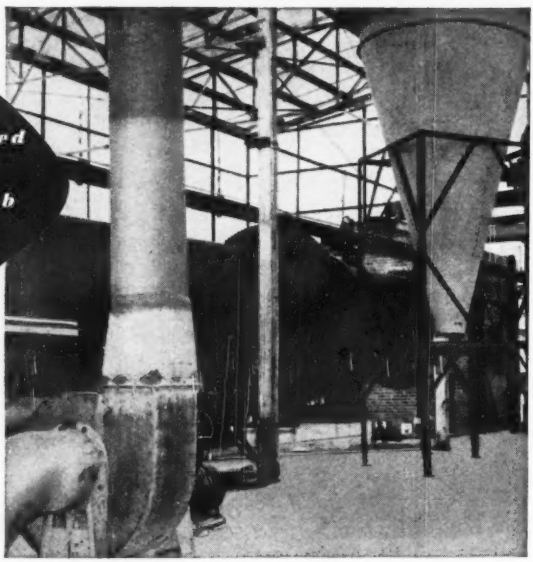
To provide indoor recreation during unseasonable weather, we then painted a shuffleboard court on one aisle of the plant and provided equipment to play the game.

See Louisville for

CREATIVE DRYING ENGINEERING

How a new Louisville Dryer can lift production by 4½ times...profits by $11.54 per ton

Designed to do your job best!



FORMER DRYER

Installed cost	$9,000.00
Annual production (tons)	450
Drying cost per ton	$18.60
Capacity, lbs. dried product per hour	600

LOUISVILLE DRYER

Installed cost	$36,000.00
Annual production (tons)	2,025
Drying cost per ton	$7.06
Capacity, lbs. dried product per hour	3,500

EXTRA PROFIT PER TON DRIED WITH LOUISVILLE DRYER $11.54

Don't call in a "boy"—when the job is man-size! Small-production dryers *can* cost you big money—as the performance comparison figures shown here prove clearly. Here's black-and-white proof that it pays to have a Louisville engineer check over your dryer capacity.

A study of your problem may show that a larger-capacity Louisville dryer—especially designed for your purpose—will turn out 4½ times more production—with little if any increase in your labor costs. In fact, labor savings alone may spell the difference between a good profit or a sagging loss.

Find out what a specially designed Louisville dryer—with output pretested in our own unique laboratory and pilot plant—will do for you. Ask for a Louisville survey of your problem. There is no obligation.

Other General American Equipment:
Turbo-Mixers, Evaporators, Thickeners, Dewaterers, Towers, Tanks, Bins, Filters, Pressure Vessels

PROCESS EQUIPMENT DIVISION GENERAL AMERICAN TRADE MARK

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Over 50 years of creative drying engineering
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That ended horseshoe pitching. Today, four shuffleboard courts are painted on aisles in as many departments of the plant. And everyone who can, participates in the sport or stands on the side lines.

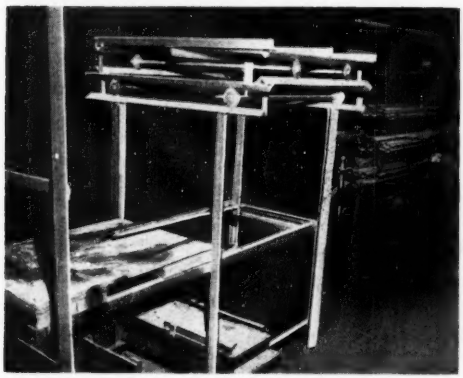
At noon, games start as soon as corn meal can be dusted on the courts. Four participate in each contest. Time of a game averages 10 min. Hence, participating recreation is provided for almost a hundred employees each noontime, while other employees enjoy watching the matches.

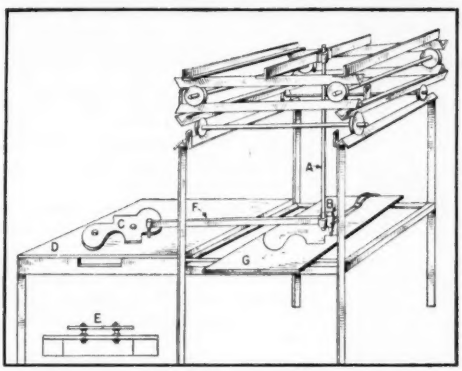
Night shifts, as well as day shifts, have their innings—often continuing the play for several hours after the work period is ended.

Players and watchers value the recreation facilities the shuffleboards provide, so much so that game areas are swept clean of cornmeal after each recreation period, and kept clean by self policing.

In fact, the men naturally frown on any game-area littering, for the disks must "slide free." And this impetus to tidiness has spread to other aisles throughout the plant.

As soon as the shuffleboard courts were painted on the runways in each section of the plant, inter-department competition began, soon followed by tournaments. These, as well as the daily competitions, have promoted goodwill and raised morale.—*Edward N. Evans, Vice-President & General Manager, Cambridge Wire Cloth Co., Cambridge, Md.*





For Cutting Odd Shapes With a Torch

Use of a shop-made pantograph has simplified and improved the cutting of metal to desired irregular patterns in our operations at Taylor Reed Co., Glenbrook, Conn.

The occasion arises in many food plants for metal to be cut in conformity with an odd-shaped design, and the job may be farmed out to a welding establishment. But if a pattern is available, the metal plate can be chalked and cut in the plant.

However, jobs of this nature are frequently inefficiently done by plant welders. Their workmanship can be greatly improved through the use of a pantograph similar to the one shown in the illustration above. The unit is simple in design and not difficult to construct.

The machine is made of angle iron and eight sheaves mounted in pairs on rods. There are no bearings. The friction is negligible—only that of the rolling sheaves.

As seen in the sketch, the vertical bar (A) is suspended from angle iron welded to the top frame. It is rigid with the top frame but free to move easily in any direction as the frame moves. The cutting torch (B) is clamped to this bar. The pattern or templet (C) is placed on the table (D). It should be elevated above the table by spools, or similar devices, as shown at (E), so that the guide pin on the end of bar (F) can trace the pattern accurately. The plate (G) to be cut is laid across the frame and secured by grip pliers or clamps.—*W. A. Reed, Plant Engineer, Taylor Reed Co., Glenbrook, Conn.*

Crown Storage Do's and Don'ts

Bottlers and canners who have had the misfortune to learn first hand that crowns can rust in storage, that cork disks can mold or dry out, and that spots can loosen, know that crowns are perishable. How perishable depends in large measure on warehouse conditions.

Here are some Do's and Don'ts which, if followed, will give your crowns more life. First, the Do's:

1. Provide a clean, cool, dry and well-ventilated room for crown storage.
2. Keep the crown cartons sealed prior to usage.
3. Heed the wise warning, "First in, first out" by using the shipments in the order received.
4. Protect cartons against water damage by floods or storms.
5. Stack cartons of crowns in neat, orderly piles, separated according to supplier, date of receiving, manufacturing date, or decoration.
6. Discard all moldy or rusty crowns immediately.
7. Keep temperature in the neighborhood of 70 deg. F.
8. Keep relative humidity about 40 percent.
9. Keep stocks in vertical alignment. Keep cases off of floors, on pallets or wooden platforms.

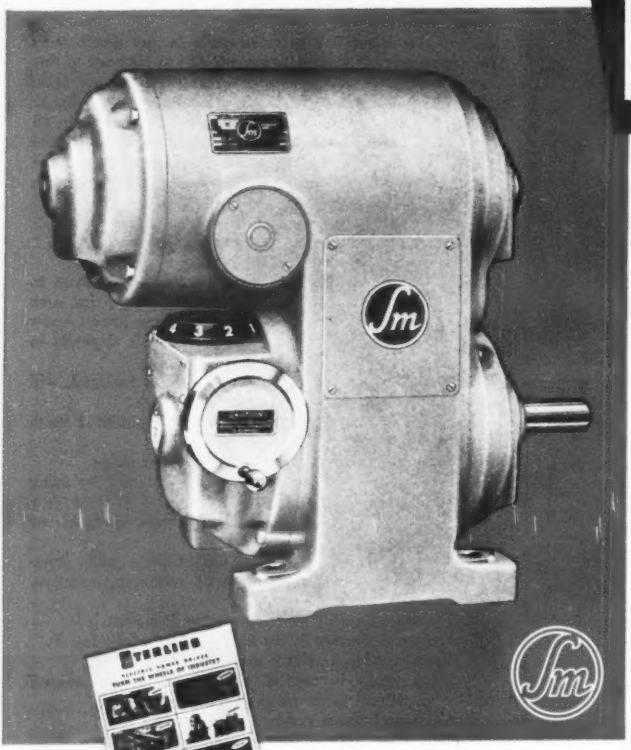
Don't commit these errors:

1. Storing of crowns near boiler room, radiators, steam pipes or hot air ducts.
2. Keeping large stocks of "spotted" crowns beyond the period of one year.
3. Moving cartons of crowns abruptly from cool locations into warmer warehouse spaces, or suddenly open storage doors to admit warm moist atmospheres.
4. Permitting the cartons to become wet from any source. This means avoidance of storage near bottle washers, faulty water or steam lines, roof-leakage areas, broken windows, damp floors, or open doors.
5. Storing of crowns nears fungicidal or preservative tanks, phenolic materials, chlorine compounds, strong alkalis, disinfectants, or sanitizers.
6. Allowing undue exposure of crowns to salt-spray atmospheres.
7. Permitting stocks of bulk storage crowns to be piled in excess of 6 to 8 cartons high, unless the load is evenly distributed.

power modernization

Even a brand new motor may be obsolete...

if you do not have control of speed



A manufacturer of Food Processing machinery states,

"Speed-Trol made possible the design of a new de-watering press which resulted in:

26% greater moisture extraction-plus corresponding savings in the reduction process."

STERLING SPEED-TROL

...GIVES YOU VARIABLE SPEED CONTROL NECESSARY FOR:

PROCESS CONTROL OF: Temperature — viscosity — level — pressure — flow — etc.

TIME CONTROL OF: Baking — drying — heating — cooking — pasteurizing — soaking — chemical action — etc.

EQUIPMENT ADAPTATION TO: Load variation — sequence synchronization. Size — tension — hardness or shape of materials to be processed — machined — conveyed — blended — mixed — etc.

VARIATIONS IN: Quality — quantity — operators' abilities — etc.

Ask for your copy of— pictorial bulletin No. A-60 showing Sterling Electric Power Drives Turning The Wheels of Industry.

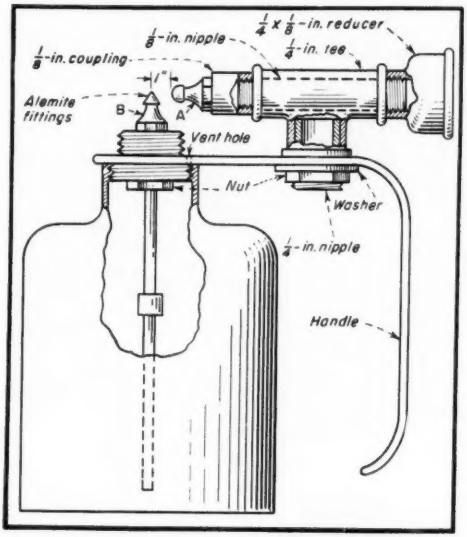
STERLING ELECTRIC MOTORS

Plants: New York 51, N.Y.; Los Angeles 22, California; Hamilton, Canada; Santiago, Chile.

Offices and distributors in all principal cities.

8. Allowing cartons to be thrown from the top of the pile to the floor, or letting them fall from the top of the stock. Cartons may be smashed, crowns damaged.

If these instructions are followed, the volume of discarded crowns will diminish.—*From a bulletin of Continental Can Co., Inc., New York City.*



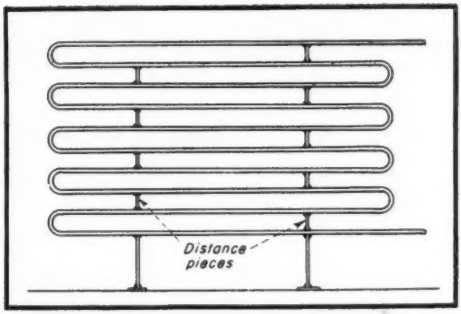
Spray Gun From Long-Neck Oil Can

A discarded long-neck oil can may be profitably converted into an efficient spray gun by attaching a few miscellaneous items, also salvaged from the junk pile.

Remove spout and trigger from can, keeping only the handle and inside tube. The materials, their size, and assembly, are indicated in accompanying sketch. The Alemite fittings have their ball check valves removed.

In use, connect the plant's compressed air supply to the spray nozzle. Put a ¼ in. valve in the air line, mounted on the can's handle, as shown, to regulate the pressure of the nozzle. Air blowing from nozzle (A) across (B) acts as an aspirator to draw paint from the can and spray it on the surface being painted.

Unit does a better job than a brush, in about half-time. —*Frank Fedorocsko, Bayonne, N. J. (In "Power").*



Wall Coils Made Self-Supporting

Only a few short lengths of pipe are needed to convert a refrigerated wall coil to a self-supported coil resting on the floor. No side straps are necessary.

There are occasions when a coil standing well away from plant walls is preferable to one attached. Such a situation arose in the department of our meat plant where we packed livers, hearts, brains and sweet breads. Most thorough cleaning is necessary each day to remove all the flesh particles which might breed bacteria.

Wall coils are adequate for maintaining the required 40 deg. F. temperature. Cleaning them and cleaning behind them requires excessive labor, with no assurance that all bacteria-breeding particles are removed from difficult-to-reach locations.

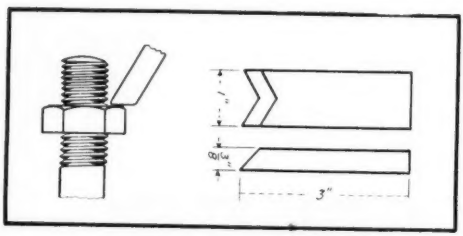
Air blasts from unit coolers, suspended from ceilings, would have been ideal for holding temperature in this department—except for the fact that the labor union here requires heavy penalty rates for those who work in a department cooled with a cold air blast.

Answer to our problem was to move coils away from walls and erect them as self-supporting units resting on, and anchorded to, the floor.

Construction (see drawing) merely called for welding one short length of pipe, as a spacer between each pair of pipes. Spacers are aligned with floor supports, thus keeping the thrust in line.

Having thus been moved away from walls, the coils can easily be reached from all sides. Also, since no straps are required, all parts of the coil are accessible for adequate cleaning.

This arrangement is satisfactory for coils with a length up to 20 ft. Longer coils should have double support.—*F. C. Beavan, Victoria, Australia.*



Way To Prevent Nuts From Loosening

In the absence of a lock-washer, there is a method of anchoring nuts to bolts so securely they will not loosen and yet not be so tight they cannot be removed.

A small, simply fashioned tool is all that is needed.

This is how to make the tool: Select any piece of hardened steel stock about 1 in. wide and close to ⅜ in. thick. A large machinist's file will serve the purpose. Cut off a piece about 3 in. long and notch one end with an obtuse V. Bevel notch to 45 deg. edge (see drawing).

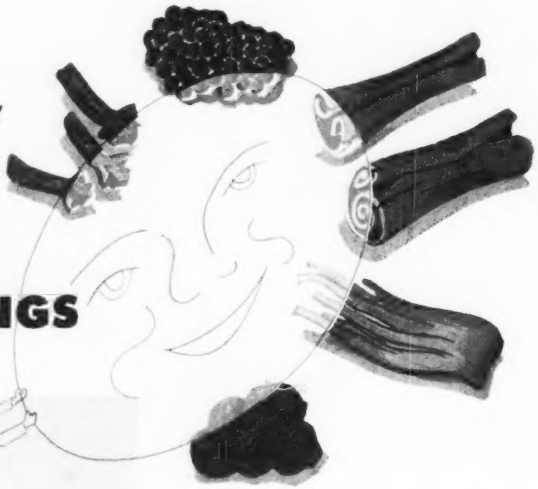
Here is how to use the tool: Hold it so that the tapered end rests on the nut and against the bolt threads. Be sure that the V-shaped notch engages in the thread nearest the bolt. Now, tap the tool on top with a hammer. As a result, threads next to the bolt are spread, or the thread next the bolt is flattened on the outer edge, or both. Either condition will lock the bolt in place.

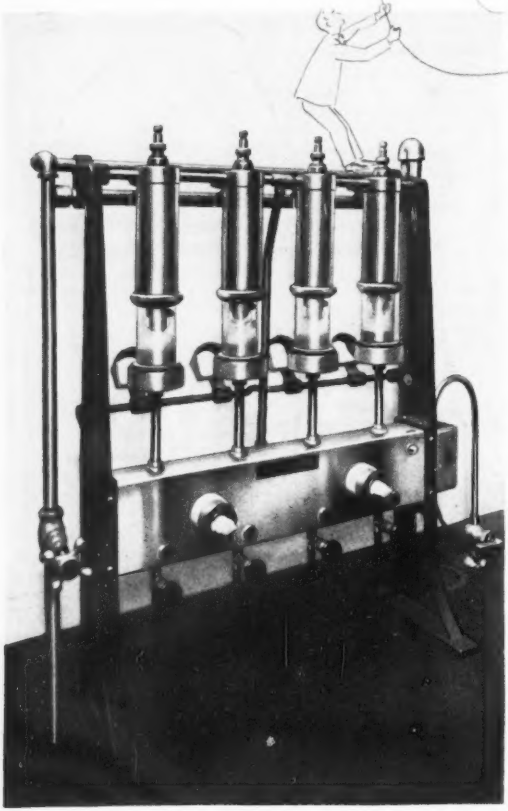
Use of this trick does not damage the threads beyond use, even though the jammed threads hold the nut so securely it will not loosen under severe vibration. Secure as the nut is against vibration, it can be removed with little more than normal effort. This is because the threads on the inside of the nut act as a die to restore the bolt.

How Griffith's Two-Phase Extraction Process* Assures Better-Flavored Products

"True" Flavors in Smooth, Mellow Blend

ROYAL SOLUBLE SEASONINGS





The Taste of Sunshine all the Time

Now, it's easy to improve the flavor quality of your products with the smooth, mellow blend of "true" spice flavors in ROYAL SOLUBLE SEASONINGS. Griffith chemists achieve a new high standard of purity and uniformity in spice flavors by a special, two-phase extraction process that overcomes nature's variations.

(1) It removes all foreign taste elements that cloud the clear "true" spice flavor. (2) Controls the potency of "true" flavor that varies from batch to batch because of weather and soil conditions where grown.

Under laboratory control, these "true" spice flavors are smoothly blended in ROYAL SOLUBLE SEASONING formulas. A test will prove them of better, uniform quality. Write us today.

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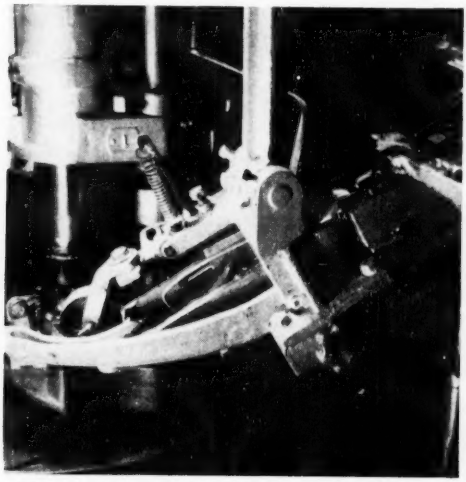
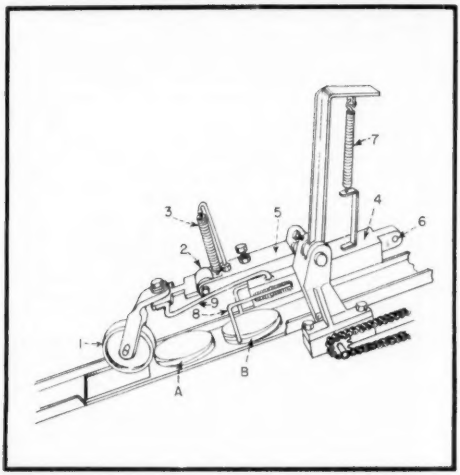
threads to their original shape without stripping them.

In the tool, the V-shaped notching is important to enable holding it in the proper position to guide the tapered ends against the threads.—*July 1951 issue of "Textile World."*





Device Improves Capping Operation

With a few pieces of bar iron, some bent wire or welding rod, and two springs, our jar-capping machine's efficiency has been much improved and the floor is no longer cluttered with caps spilled from the feed discharge.

On this screw-cap closing machine, the caps are released from the feed mechanism to rotating arms that carry them to the jars. The revolving arms operate a roller cam to effect the release. But too often the discharge of one cap would be followed by loss of the next cap through the gap—before the cam follower could return to position.

Now, however, we have made a few inexpensive changes that have perfected this part of the machine's operation.

Referring to our drawing, the roller cam follower (1), which is hinged at (2), is a part of the machine's original mechanism. So also is spring (3). The other numbered parts were added to improve the mechanism.

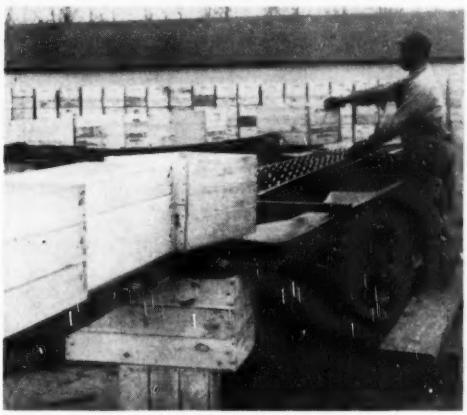
During the machine's normal operation the cam follower (1) is lifted by its cam to release a cap, then returns to its former position by its own weight and the tension of spring (3). It was while the cam follower was up that caps slid off the feed channel to the floor.

Now to the improvements that made the feed function satisfactorily:

First, a bar of iron (4) was cut to fit under the frame (5) on which the cam follower is hinged at (2). The bar (4), hinged at (6), is held in a raised position by the tension of a strong spring (7). On both sides of the bar, pieces of heavy wire or welding rod (8) were welded. These are bent down like fingers.

The final addition to the mechanism is a rod (9), welded to the cam-follower frame. When the roller is lifted by its cam, this rod depresses bar (4), causing fingers (8) to engage jar cap (B) from sliding to the feed opening.

When cap (A) is in place on the rotating arm, roller (1) drops, closing the feed opening. Lowering of the roller on its hinge lifts rod (9). This permits the spring tension in coil spring (7) to lift bar (4) and fingers (8), releasing cap (B) to slide into the position vacated by cap (A). And so, operation of this machine is now smooth and dependable.—*F. E. Staff.*



Simple Treatment Extends Box Life

An inexpensive application of wood preservative extends the life of field boxes and reduces replacement costs.

Field boxes are expensive tools of canners and freezers, whether they realize it or not. The first cost is high and maintainance is often excessive. If field boxes contaminate the highly perishable produce they transport, they become an extravagance.

Seabrook Farms, Bridgeton, N. J., whose field box requirements run to 75,000 "highs" and 50,000 "flats" per year, has reduced the maintenance and replacement cost of boxes, and at the same time minimized the danger of produce contamination. This has been accomplished by dipping the wood containers in a wood preservative, Cellu-san (see photo).

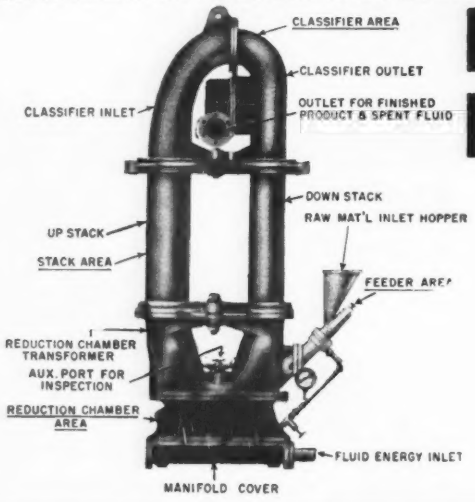
After two years of experience with the dipped boxes, Seabrook reports these results: (1) The treatment has no harmful effect on produce transported; (2) preservative penetrates the wood, making it water-proof, mold-proof and almost rot-proof; (3) tare weight losses due to water-logged boxes are avoided; (4) boxes last longer; (5) they require less maintenance and repair; and (6) The preservative is not expensive, is easily applied, and economical in labor costs.

C.H. Wheeler

"MOTIONLESS" MILL GRINDS PARTICLES

as low as 100 times finer than the human eye can see

FLUID ENERGY MILL



NOW AVAILABLE WITHOUT

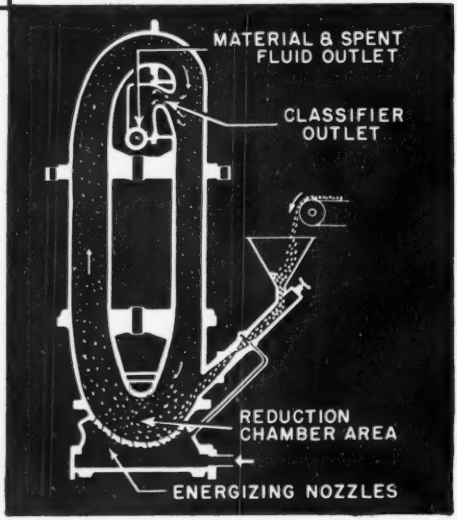
LEASE OR ROYALTY

HOW FLUID ENERGY WORKS

The Wheeler Fine Particle Mill is motionless in that it has no moving parts. Material at approximately 4 mesh or less is fed in at a controlled rate and entrained by energized fluid (air, steam or any gas or vapor) traveling around the reduction chamber at sonic or supersonic velocities. Particles break themselves up by repeated shattering against each other. When they reach desired size (micron or sub-micron) they escape with spent fluid through the classifier outlet into collectors of Wheeler design. Centrifugal force keeps the coarser particles toward the outside of the circuit until they grind each other down.

FEATURES OF THE C. H. WHEELER FINE PARTICLE MILL

1. No moving parts. No rapid wear.
2. Continuous reduction for continuous processing.
3. Micron particle sizes far below the limits of the finest mesh of mechanical methods—as low as ½ micron average particle size.
4. Lower cost per ton over mechanical grinding in sizes below 44 microns.
5. Ideal grinding "climate" possible by controlling temperature, velocity, humidity, and type of fluid medium.



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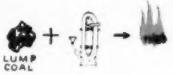
Cooling Towers—Vacuum Refrigeration—High Vacuum Equipment—Micro-Particle Reduction Mills

HAS MANY USES IN CONJUNCTION WITH GRINDING

DRYING: Use of air or superheated steam as the fluid medium removes moisture from the product, combines particle reduction with drying.

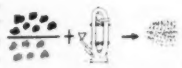


COATING: By controlling "climate" and feed rate, sprayed coating or dust coating of fine particles can be accomplished during the process of reduction.

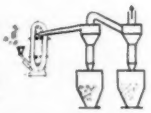
BREAKING UP AGGLOMERATES: Small particles which are grouped in agglomerates can be dispersed economically.

CHEMICAL REACTIONS: By controlling "climate" and conditions of feed, chemical changes can be effected and regulated.

BLENDING OR MIXING: Blending and mixing of ingredients for a wide variety of products can be combined with the process of reduction.



SIZE CLASSIFICATION: Automatic size classification is an inherent feature of the mill design. It is further augmented by the unique primary and secondary collectors.



NEW SUB-MICRON RANGES FOR YOUR GRINDING PROCESS MAY IMPROVE YOUR PRODUCT SEVERAL WAYS

FINER TEXTURE. Surfaces of particles become smooth and uniform.

MORE UNIFORM AND NARROWER DISTRIBUTION RANGE. By close control of particle size.

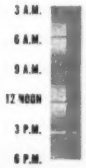
ENDURING SUSPENSION. With finer, more uniform particles the settling rate in suspension is decelerated.

A PURE PRODUCT. Mill wear with its contamination of the product is practically eliminated.

FASTER REACTION. The finer the particle the greater the surface area exposed to combustion, absorption, or any other chemical reaction.

MORE UNIFORM COLOR. Finer particles disperse more uniformly in a vehicle resulting in more uniform color—enhances the appeal of many products.

EXACT COLOR MATCHING. Through control of feed materials and operating conditions uniformity found in one period may be duplicated at any other time.



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Cocoa	Gelatins	Puddings	Vanilla Beans
Cocoa Nibs	Malt	Seeds	Vegetables
Condiments	Milk Chocolate	Soybeans	Wheat

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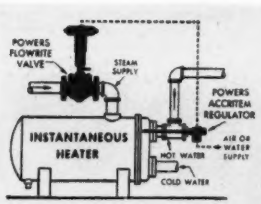
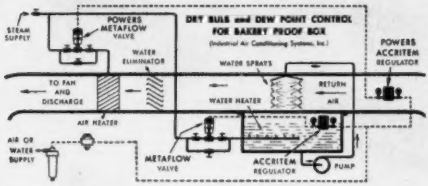
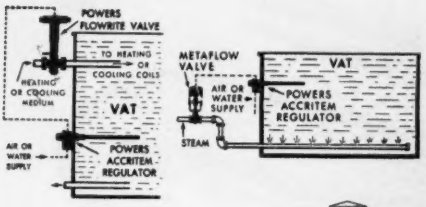


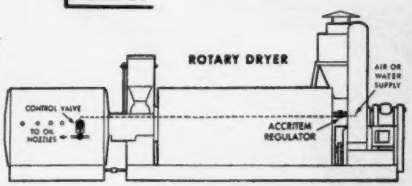
POWERS

ACCRITEM REGULATOR

Only a few of many uses







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IMPORTANT ADVANTAGES

- ***Adjustable Sensitivity*** and over-heat protection.
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- ***Temperature Ranges*** 50 to 250° F. and 150 to 350° F.
- ***Easy to Install*** Requires 15 lb. supply of compressed air or water for its operation.
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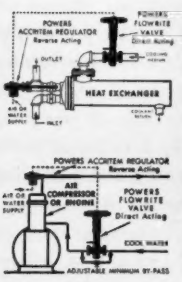

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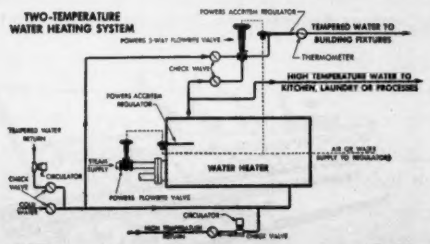
ACCRITEM HEAT REGULATOR
provide an unbeatable combination for *better control and lower maintenance*



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(AMP)

60 Years of Temperature and Humidity Control

Let's take a
CLOSER LOOK at

STAINLESS TUBING FABRICATION

If you make or maintain food processing equipment, chances are you encounter one or more problems of workability in welded or seamless stainless steel tubing. The random group of tubular parts above represents a wide range of fabricating problems successfully met by a variety of B&W Stainless analyses ... carefully selected, not only for chemical and mechanical properties, but also for the *mill condition* best suited to the fabricating requirements of each product. Remember, tubing is more than bar stock with a hole in it. It's a semi-finished product. Be sure that your tube mill is doing as much of your work as is practicable *before delivery* by pre-conditioning your stainless tubing for fastest, most economical fabrication. You can be sure by consulting Mr. Tubes—your B&W Tube Company Representative. Write for Bulletin TB-1.

THE BABCOCK & WILCOX TUBE COMPANY

Executive Offices: Beaver Falls, Pa.

General Offices & Plants

Beaver Falls, Pa.—Seamless Tubing; Welded Stainless Steel Tubing

Alliance, Ohio—Welded Carbon Steel Tubing

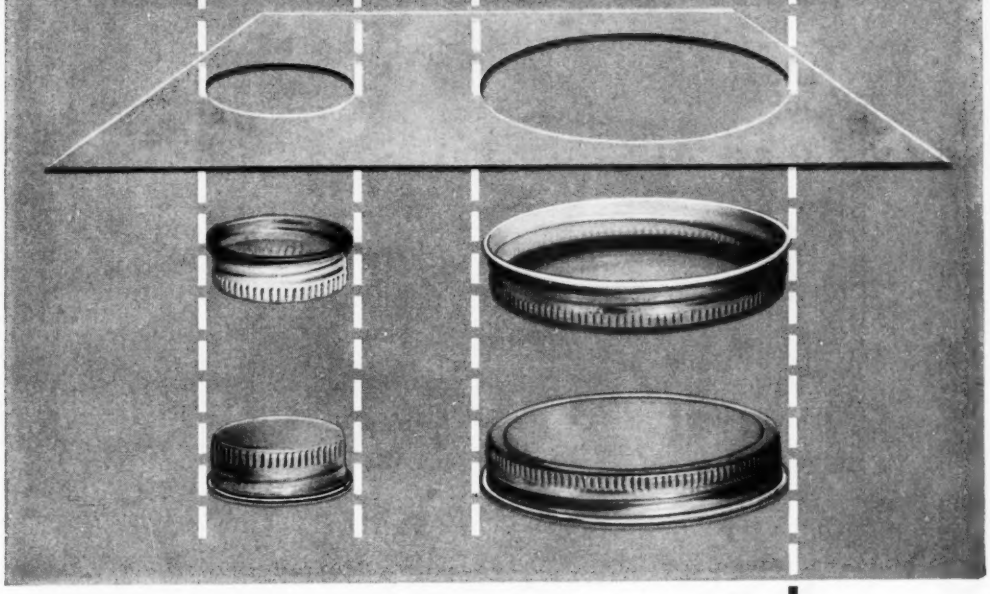
Sales Offices: Beaver Falls, Pa. • Boston 16, Mass. • Chicago 3, Ill. • Cleveland 14, Ohio • Denver 1, Colo. Detroit 26, Mich. • Houston 2, Texas • Los Angeles 17, Calif. • New York 16, N. Y. • Philadelphia 2, Pa. • St. Louis 1, Mo. • San Francisco 3, Calif. • Syracuse 2, N. Y. • Toronto, Ontario • Tulsa 3, Okla.

B&W SEAMLESS and WELDED TUBES

(TA-16425)

MADE BETTER, FASTER, AT LESS COST—BECAUSE THEY'RE

COATED IN THE FLAT



And the secret lies in tough, flexible coatings based on VINYLITE Brand Resins.

You see, after a coating of this tenacious material, the sheet metal is formed, drawn, crimped and stamped—without a trace of damage to the coating itself. And the job, colored as desired, is complete! In spite of all the processing, the coatings are not damaged.

In a class by themselves, these remarkable coatings, based on VINYLITE Resins, not only take the abuse of stamping and forming machines. They also maintain their bull-dog adhesion and bond for years of hard service.

Add to this: They're odorless, tasteless, non-toxic, and extremely resistant to moisture, oils, greases, alkalies, most strong acids and other chemicals.

You can see why they're virtually unbeatable as coatings on closures, containers, tanks, vats, equipment, for foods, pharmaceuticals, and a host of other solids and liquids that must be processed, packaged, shipped, preserved and protected.

Let us tell you more facts—help you with the correct use or formulation of durable, flexible, colorful, money-saving coatings based on VINYLITE Brand Resins. Write Dept. LF-74.

Data courtesy Crown Cork & Seal Company, Eastern Ave. and Kresson St., Baltimore 3, Md.

Vinylite

RESINS

BAKELITE COMPANY

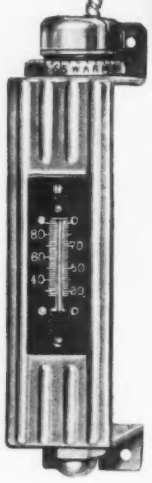
A Division of

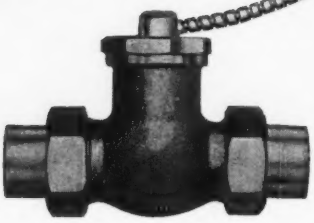
Union Carbide and Carbon Corporation

30 East 42nd Street, New York 17, N. Y.

SYLPHON CONTROLS FOR DEPENDABILITY

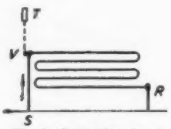
TRIM IDEA FOR Thrifty COMFORT CONTROL!



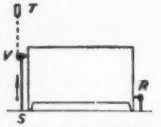


LEGEND:

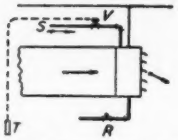
- **T** *Room thermostat*
- **V** *Control valve*
- **S** *Steam supply*
- **R** *Trap in steam line*



Typical application—No. 7 used for controlling steam to coil radiator.



No. 7 controlling steam to exposed radiator. May also be used with groups of exposed—or concealed—radiators.



No. 7 controlling steam to ceiling type unit heater—for heating and ventilating. Thermostat "T" installed on room wall or column.

● Comfort-conditioning in offices or plants is easy—all winter long—with Sylphon Temperature Regulators. They automatically maintain healthful, comfortable temperatures. They're sturdy—self-contained—self-powered.

No. 7 unit heater control, pictured here, is one of the Sylphon line of "comfort regulators." It's ideal for unit heaters, wall or ceiling type radiators. It's highly sensitive and fully modulating—accurate—practically indestructible.

The thermostat unit can be installed at the best point on wall or column for regulating area temperature. And once temperature is "set," it *stays* as wanted.

Sylphon Temperature Regulators pay for themselves many times over in benefits gained—in fuel saved. Send for information about No. 7, or other Sylphon regulators for duct systems, etc. Ask for Catalog TG-250.

Temperature Controls • Bellows Devices • Bellows Assemblies

FULTON SYLPHON
DIVISION

FIRST WITH BELLOWS

ROBERTSHAW-FULTON CONTROLS CO., KNOXVILLE 4, TENN.

Canadian Representatives, Darling Brothers, Montreal

THEY GO GREAT WITH A.1. SAUCE

SHAKE WELL
BRAND'S
THE
A.1.
REG. U.S. PAT. OFF.
INTERNATIONAL
SAUCE
This Most Wholesome and Excellent Sauce is made from Tomato Puree, Orange Marmalade, Raisins, Onions, Garlic, Malt Vinegar, Sugar, Salt, Tragacanth, Spices and Flavorings.
IN GENERAL USE
Throughout the world
CONTENTS 5 FLUID OZ.
MANUFACTURED BY FOOD DIVISION G.F. HEUBLEIN & BRO. INC. HARTFORD, CONN.
THE ORIGINAL THICK SAUCE
FOR TABLE AND KITCHEN USE

and so do

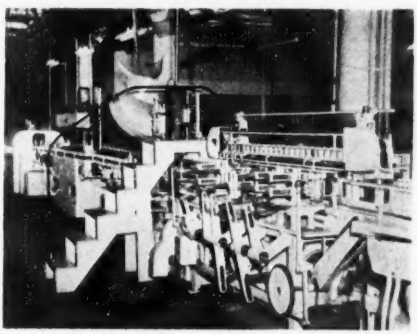
PNEUMATIC MACHINES!

It is said that England's King George IV, a good judge of good savoring, complimented his chef on a particular sauce, calling it "A.1." It has been sold as A.1. ever since, to equally enthusiastic users the world over!

Cleaning, filling, capping and labeling the distinctive A.1. bottle is a task that G. F. Heublein & Bro., Inc., gave to Pneumatic machines. They bought their first Pneumatic equipment 20 years ago, and they've been doing it ever since. Recently they installed more — including a Pneumatic Close-Coupled Combination that air cleans, fills and caps their famous bottled cocktails in one operation!

Pneumatic equipment is A.1. with Heublein — and many, many others — because it does an A.1. job at "lower cost per container."

Pneumatic Scale Corp., Ltd., 91 Newport Avenue, Quincy 71, Mass. *Also: New York; Chicago; San Francisco; Los Angeles; Seattle; Leeds, England.*



Installation of Complete Pneumatic Bottling Line at Heublein's Hartford Plant.

PNEUMATIC PACKAGING AND BOTTLING MACHINERY

This is Why the Nash is the Most Simple Compressor

It's the Nash!

There are no mechanical complications in a Nash Compressor. A single moving element, a round rotor, with shrouded blades, forming a series of buckets, revolves freely in an elliptical casing containing any low viscosity liquid. This liquid, carried with the rotor, follows the elliptical contour of the casing.

The moving liquid therefore recedes from the rotor buckets at the wide part of the ellipse, permitting the buckets to fill with gas from the stationary Inlet Ports. As the casing narrows, the liquid is forced back into the rotor buckets, compressing the gas, and delivering it through the fixed Outlet Ports.

Nash Compressors produce 75 lbs. pressure in a single stage, with capacities to 6 million cu. ft. per day in a single structure. Since compression is secured by an entirely different principle, gas pumping problems difficult with ordinary pumps are often handled easily in a Nash.

Nash simplicity means low maintenance cost, with original pump performance constant over long periods. Data on these pumps sent immediately on request.

No internal wearing parts.

No valves, pistons, or vanes.

No internal lubrication.

Low maintenance cost.

Saves floor space.

Desired delivery temperature automatically maintained.

Slugs of liquid entering pump will do no harm.

75 pounds in a single stage.

NASH ENGINEERING COMPANY
313 WILSON, SO. NORWALK, CONN.

"How are these new aluminum kettles doing?"

"Great, Mr. Clemens*, we've increased our production considerably."

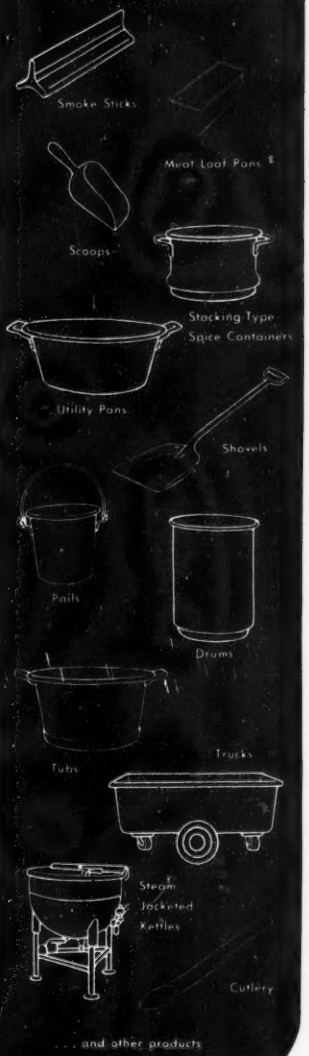
It's easy to understand why this and other food processors get enthusiastic about Wear-Ever Aluminum Steam Jacketed Kettles. For, when they convert to aluminum, the kettle department's production usually increases. This faster production is possible because aluminum spreads heat quickly and evenly *right to the top edge of the kettle.* Consequently, foods cook faster. And because the heat is spread so evenly, they cook better; scorching and burning are practically eliminated.

Moreover, every Wear-Ever Steam Jacketed Kettle—like all Wear-Ever food plant equipment—is made of an extra tough, extra hard aluminum alloy. Wear-Ever kettles have set amazing records for 20 to 30 years of continuous service—records which kettles made of the new hard alloy are sure to surpass some day.

For details on Wear-Ever's complete line of food plant equipment, see your Wear-Ever representative or mail the coupon below.

*Mr. Ezra S. Clemens
Hatfield Packing Co., Hatfield, Pa.

WEAR·EVER ALUMINUM EQUIPMENT FOR FOOD PLANTS



WEAR·EVER Aluminum

Standard of Quality for more than 50 years

WEAR-EVER ALUMINUM TRADE MARK REG. U.S. PAT. OFF.

The Aluminum Cooking Utensil Company
310 Wear-Ever Building, New Kensington, Pa.

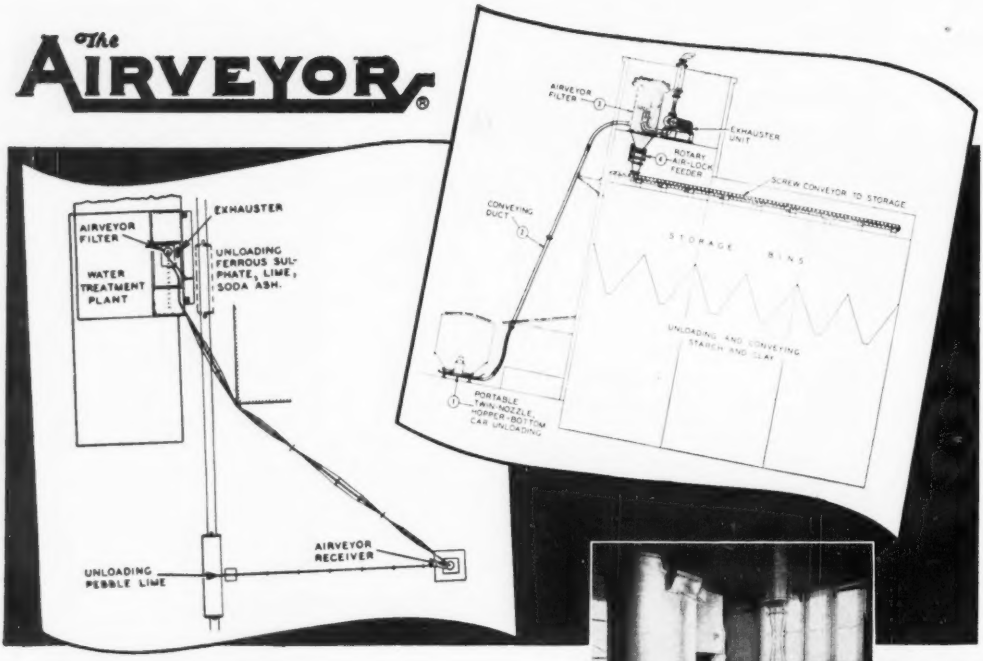
Please send me full details about your line of sanitary, hard-alloy aluminum kettles and other food plant equipment.

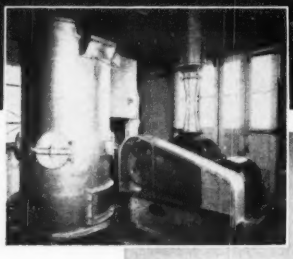
NAME. . . . . .

ADDRESS. . . . . .

Fill in, clip to your letterhead, and mail

The AIRVEYOR®





Pre-planning means a more efficient installation

. . . always START FROM SCRATCH

When you handle dry pulverized and granular materials, the sensible, economical, and most satisfactory plan of selecting a pneumatic conveying system is to "Start from scratch" . . . make your selection while the plant is still in the planning stage. Pneumatic conveyors permit economy and convenience in location of buildings and production equipment without the restrictions or straight-line limitations of mechanical conveyors.

Fuller Engineers have years of experience in their field. They'll survey your plans, make a close study of local conditions and the materials to be handled. Then—they'll make their recommendation from one of the four Fuller time-and service-proved systems, at no obligation to you.

And—because each installation has peculiar requirements of its own—their recommendation will be the right one for the job—the system that will handle your materials in the most efficient and economical way. Shown here is the Airveyor, used successfully for unloading dry pulverized, crushed, granular materials from shipping units, and for conveying to and from storage. It is economical, safe, thoroughly dependable.

Fuller has specialized in pneumatic conveying systems and knows from experience that the most successful, the most economical, and the most trouble-free installations are engineered and built along with the plant, with individual requirements in mind. Call on Fuller when planning a new plant or modernizing an old one; you'll be sure of a conveying system that meets your requirements in every detail.

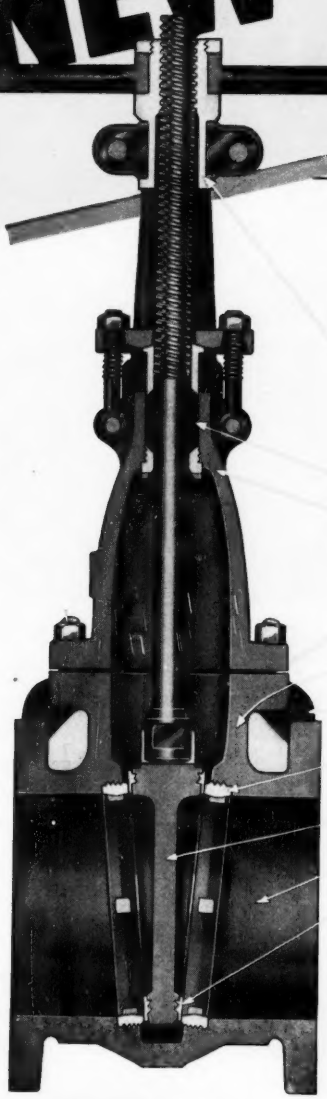
FULLER COMPANY, Catasauqua, Pa.
Chicago 3—120 So. LaSalle St.
San Francisco 4—420 Chancery Bldg.

Fuller

DRY MATERIAL CONVEYING SYSTEMS AND COOLERS — COMPRESSORS AND VACUUM PUMPS — FEEDERS, AND ASSOCIATED EQUIPMENT

A-129

NEW . . . a completely redesigned line of IRON VALVES by OIC



NOW the workhorse of the family—OIC's iron valve—offers you features formerly found only in steel valves. It's a brand new valve built around more than a third of a century's experience in making iron valves. We kept only the old handwheel.

Examine these construction details:

1 Lubricated yoke bushing, renewable without removing bonnet.

2 Deeper stuffing box; longer packing life.

3 Inserted back seat bushing permits repacking under full pressure.

4 Stronger body-bonnet joint; uniform gasket compression.

5 Better metal distribution, reduced weight, increased strength.

6 Sturdy tie-ribs; added resistance to pipeline stresses.

7 End-seated bronze seat rings will not loosen in service.

8 I-Beam type solid wedge, accurately guided.

9 Straight-through port areas reduce flow resistance.

10 Rolled-in seat facings on wedges give longer life.

OIC's new line of Iron Valves gives you longer service, lower upkeep and greater security. For Bulletin 805 telling you all about them, call your local OIC distributor or write The Ohio Injector Company, Wadsworth, Ohio.

OIC
FOUNDED 1881

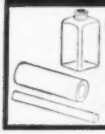
VALVES

FORGED AND CAST STEEL · IRON · BRONZE

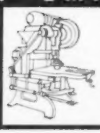
For The Blatz Brewing Company which uses Standard-Knapp packers and conveyors in its new bottling plant. "We certainly are happy," reports Blatz, "with the performance which our Standard-Knapp equipment has rendered during three years of operation in our new bottling plant. This department has recorded an amazingly high degree of efficiency in regular evaluations and much of that efficiency is due to the continued and dependable operation of Standard-Knapp packers."

Only the best is

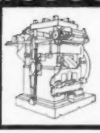
OTHER EMHART PRODUCTS INCLUDE:



PLASTIC BOTTLES, RODS, TUBES, SPECIAL SHAPES
PLAX CORPORATION
Subsidiary of Emhart Mfg. Co.
HARTFORD 1, CONNECTICUT



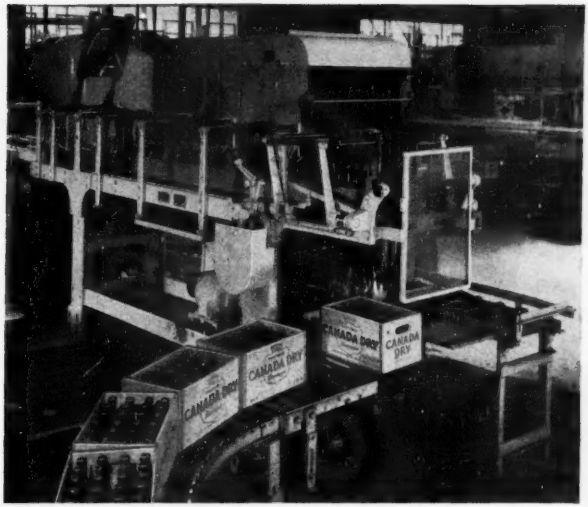
PREMIUM QUALITY STAMPING PRESSES
THE V & O PRESS CO.
Division of Emhart Mfg. Co.
HUDSON, NEW YORK



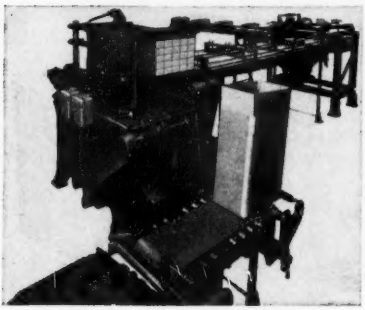
HIGH SPEED AUTOMATIC PRESSES
HENRY & WRIGHT
Division of Emhart Mfg. Co.
HARTFORD 5, CONNECTICUT

GLASS MAKING MACHINES
HARTFORD-EMPIRE CO.
Division of Emhart Mfg. Co.
HARTFORD 2, CONNECTICUT

In the field of automatic packaging equipment



For Canada Dry where Standard-Knapp bottle packers help this famous company maintain its production lines at top efficiency. Standard-Knapp bottle packers—and other automatic packaging machines—are the choice of leaders in every field seeking speed and dependability now and for the years ahead.



For American Tobacco which keeps its packaging lines moving at peak efficiency with the aid of Standard-Knapp gluers and sealers, collectors and carton packers. In the field of automatic packaging, Standard-Knapp machines are automatically preferred.

For The Food Industry

Standard-Knapp machines are automatically and efficiently unloading empty bottles . . . rinsing glass containers . . . labelling cans and bottles . . . packing filled cans, bottles, cartons and bags into shipping cases . . . gluing and sealing shipping cases . . . printing, coding and dating.

good enough

FACT-PACKED CATALOGS

Want to review Standard-Knapp automatic packaging machines in detail? Our catalogs will give you some eye-opening facts.

Please write Dept. F, Standard-Knapp, Portland, Connecticut.

STANDARD-KNAPP

DIVISION OF
EMHART MFG. CO.

PORTLAND, CONNECTICUT

Buy the right HYSTER® 20 to fit your particular job

The *right* Hyster 20 lift truck, with the *right attachments*, tools and accessories, becomes the greatest cost cutting machine in the entire field of materials handling equipment.

6 variations of one basic model...select the one that best suits your needs

What lifting and transporting capacity do you require from a lift truck? In the HYSTER 20 you can have a model with—

1) **2000 lbs.** capacity at 15" load centers (Standard Hyster 20)
2) **2000 lbs.** capacity at 24" load centers (Optional additional counterweight added to Standard 20)
3) **1300 lbs.** capacity at 15" load centers (Skeleton counterweight)
4) **1000 lbs.** capacity at 24" load centers (Skeleton counterweight)
5) **2000 lbs.** capacity at 15" load centers (Skeleton counterweight plus optional additional counterweight)
6) **1500 lbs.** capacity at 24" load centers (Skeleton counterweight plus optional additional counterweight)

Where the transporting of 2000 lbs. on 24" load centers is a prime requirement, the installation of the additional optional counterweight to the standard 20 model achieves the necessary result.

The Hyster 20 with skeleton counterweight is of great importance where floor load limits exist; where elevator lifting capacities are materials handling factors; and where a high percentage of the loads are in the 1000 lb. range.

By quickly installing the additional optional counterweight to this same Hyster 20 with skeleton counterweight, lifting capacities are increased from 1300 lbs. to 2000 lbs. at 15" load centers; and increased from 1000 lbs. to 1500 lbs. at 24" load centers. This gives the owner a 2 in 1 lift truck combination.

Why carry around extra weight?

The Hyster 20 for 1300 lbs. at 15" load centers or 1000 lbs. at 24" load centers has a skeleton counterweight that reduces the weight of the standard Model 20 by 600 lbs. This light weight but heavy duty fork lift truck will cut maintenance and operating costs; yet it will provide the maximum lifting and transporting capacities required in a great many industries.

The additional optional counterweights can be installed in less than 30 minutes; removed in much less time.

See your Hyster dealer for further information.

HYSTER COMPANY

THREE FACTORIES

2902-35 N. E. CLACKAMAS ST., PORTLAND 8, OREGON
1802-35 NORTH ADAMS ST. . . . PEORIA 1, ILLINOIS
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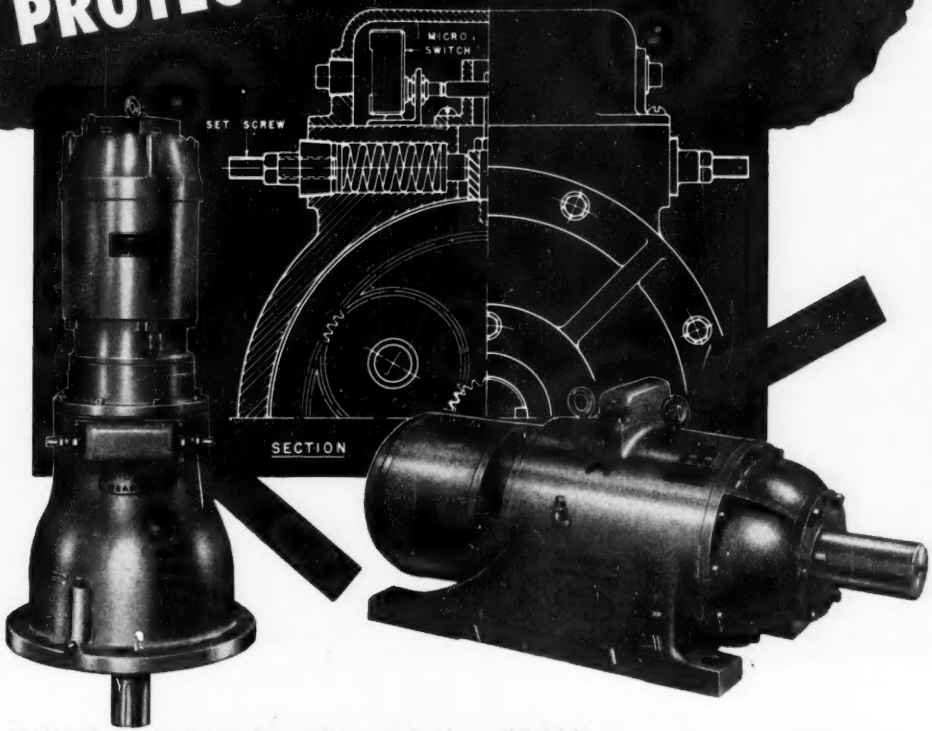
HYSTER

Instant PROTECTION Against overload

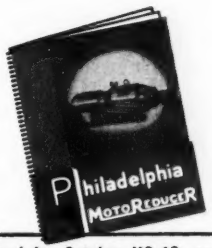


The PlaneTorque is a feature that can be supplied with any Philadelphia MotoReduceR *(combined motor and speed reducer)* or Philadelphia Planetary Reducer to protect both the driven machinery and the drive unit from dangerous overloads.

By direct mechanical action of the overload, motor current is *automatically and instantly cut off* when a pre-determined limit is reached. This action is quicker than electrical thermal relays provide. (With fuse protection only, fuses must be selected to carry the starting current of the motor; therefore, protection during running period is *not adequate*.)

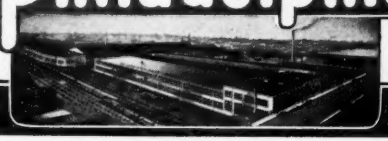
The PlaneTorque can be cut-out during the starting period by merely holding down the starting button, but will become operative during running period when button is released. To re-start the PlaneTorque MotoReduceR after overload cut-off, *only removal of excessive load is necessary . . . a big time-saving feature.*

For applications such as stoker drives, conveyor drives, mixers, agitators, roll drives, etc. . . . investigate the PlaneTorque MotoReduceR.



Send for Catalog MR-49, and please use your Business Letterhead when writing.

Philadelphia Gear Works, INC.



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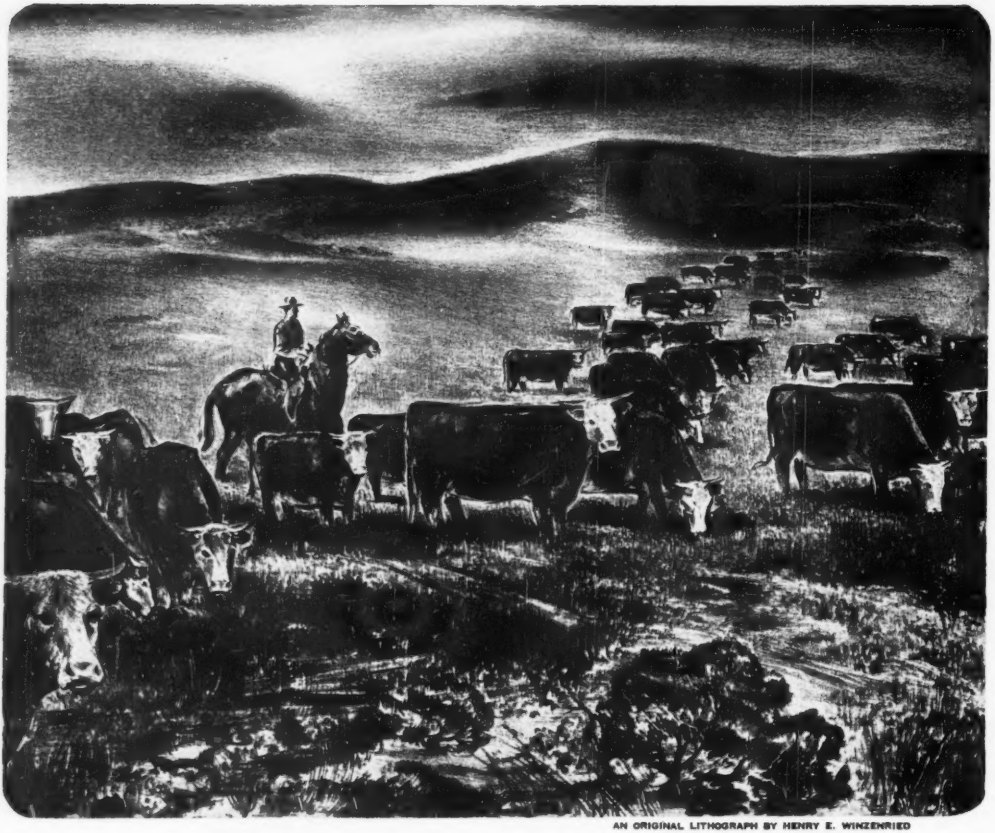
NEW YORK • PITTSBURGH • CHICAGO • HOUSTON • LYNCHBURG, VA.
IN CANADA: WILLIAM AND J. G. GREEY LIMITED, TORONTO

Industrial Gears and Speed Reducers
LimiTorque Valve Controls



AN ORIGINAL LITHOGRAPH BY HENRY E. WINZENRIED

HOME ON THE RANGE

From western range to kitchen range, meat travels a devious route through many processes. Protective papers are constantly needed . . . specially developed papers such as locker wraps for frozen meats, greaseproofs for ham and bacon, board liners for franks and sausage, or wet-strength papers for chopped meat. There are papers for by-products, too . . . lard, bouillon cubes and gelatine. Other Riegel Papers are found nearly everywhere in the meat industry . . . always with the right combination of protection, economy and machine efficiency.

Hundreds of other Riegel papers, for almost every type of protective package, are now serving the sales leaders in many different fields. In spite of present conditions, we are constantly developing even more varieties for companies who join us in planning for the future. Write for information.

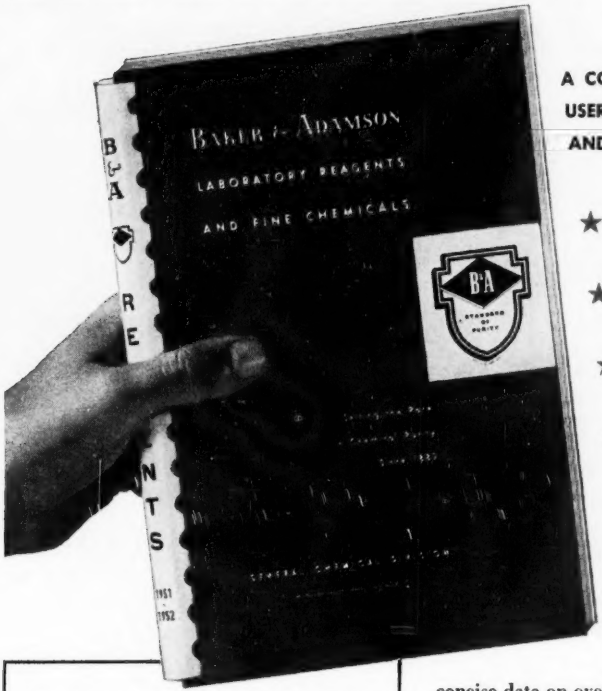
Riegel Paper Corporation • 342 Madison Avenue, New York 17, N. Y.

Riegel TAILOR-MADE PAPERS FOR PROTECTIVE PACKAGING

Announcing...

THE BIG NEW 1951-52

B&A CATALOG of Reagents & Fine Chemicals



A COMPLETE BUYERS' GUIDE FOR USERS OF LABORATORY REAGENTS AND FINE CHEMICALS

- ★ For Manufacturing Control Laboratories
- ★ For Production Requiring Quality Chemicals
- ★ For Process Planning and Development
- ★ For Research Laboratories
- ★ For Educational Laboratories

Just off the press—Baker & Adamson's new 1951-52 Catalog is profusely illustrated . . . packed with 264 pages of important information. Gives clear, concise data on over 1,000 B&A Laboratory Reagents and Fine Chemicals! Includes such pertinent facts as grades, strengths, maximum limits of impurities, etc. If you buy or specify laboratory reagents, this new 1951-52 B&A Catalog belongs on your desk. Send for your copy today.

Packed with helpful information

STORAGE AND HANDLING: Special section gives helpful "do's and don'ts" on handling chemicals that require extra precautions.

PACKAGING SECTION: Exclusive new feature—photographs and full details on major B&A packaging, including:...the "PBL" Drum with polyethylene liner, the 9-bottle case for reagent acids, the 6-½ gallon carboy, the "Saftepak" plastic dispenser for HF, and many others.

EXTENSIVE DATA: Over 230 pages of specifications, other pertinent data on B&A Reagents, also on many Fine Chemicals.

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BAKER & ADAMSON PRODUCTS, General Chemical Division
ALLIED CHEMICAL & DYE CORPORATION
40 Rector Street, New York 6, N. Y.

Please send me your new 264 page catalog of Baker & Adamson Reagents and Fine Chemicals for 1951-52.

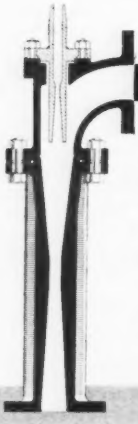
Name_____

Organization_____ Position_____

Address_____

City_____ Zone____ State_____

21-10



...vac down to .002" (50 microns)

YOU CAN SAVE

operating and upkeep costs WITH I-R STEAM-JET EJECTORS

Single-stage ejector with direct-contact type aftercondenser.

Two-stage, single-element ejector with direct-contact type intercondenser.

Single-stage, twin-element ejector mounted on surface-type precooler and aftercondenser.

Two-stage, single-element, non-condensing ejector.

Two-stage, twin-element ejector with surface-type intercondenser and aftercondenser.

Three-stage ejector with direct-contact type intercondensers.

Large booster-type ejector, similar to smaller sizes except with multiple one-piece steam nozzles and welded construction.

Whatever the capacity—whatever the gases or vapors to be handled—Ingersoll-Rand steam-jet ejectors can generally do the job far more economically than any other type of equipment. Their utter simplicity of design and operation assures long life and sustained high efficiency, with practically no maintenance at all.

Suction pressure is obtained by a steam-jet discharging into a specially formed suction chamber and venturi-shaped diffuser. That's all there is to it. There are no moving parts to wear out—no excessive noise—no vibration. Ejectors can be installed anywhere, with little or no foundation, and can be operated by inexperienced personnel.

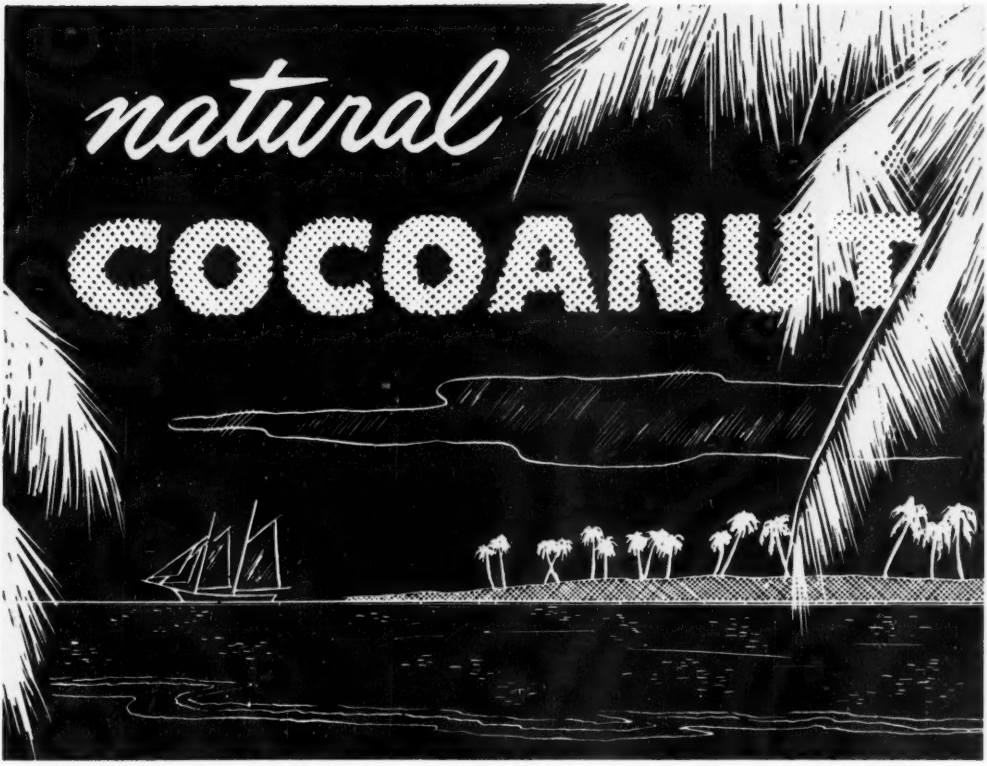
Single-stage, two-stage and multi-stage ejectors can be supplied in any required combination—with pre-coolers, intercondensers and aftercondensers to meet the specialized needs of practically any application for suction pressures down to 50 microns (.002" Hg absolute).

Ingersoll-Rand's unequalled experience in vacuum equipment—both steam-jet ejectors and reciprocating pumps—is your assurance of impartial service in meeting your low-pressure requirements. For further information, contact your nearest I-R representative, or write for a free copy of Bulletin 9013A.

Ingersoll-Rand

11 Broadway, New York 4, N. Y. 482-4

COMPRESSORS • AIR TOOLS • ROCK DRILLS
TURBO-BLOWERS • CONDENSERS • CENTRIFUGAL PUMPS
DIESEL & GAS ENGINES



faithfully reproduced!

In the instance of cocoanut flavor, Alva research has developed a basic formula which is obviously an improvement over similar commercial products.

This prime Alva formula has been successfully adapted in the development of imitation cocoanut flavors specifically designed for use in candies, ice-cream, baked goods and desserts.

Samples of Alva imitation cocoanut for your paticular use will be sent on request. Let us also send you the complete Alva catalog of flavors for all uses.

VAN AMERINGEN-HAEBLER, INC.

521 WEST 57th STREET, NEW YORK 19, N. Y.

Alva FLAVORS

"Cuts pressing time 1/3 with help of CELITE"

A report on prune pressing by a Celite Field Engineer

"BEFORE USING CELITE* Pressing Aids, one of my customers was getting only two batches of prune juice per day from the presses. When he started mixing a small percentage of Celite with the cooked fruit, the saving in pressing time was apparent at once. Now he gets three batches per day.

"In addition, the juice is much clearer and cloth breakage is reduced to the point where this alone represents a big saving."

. . .

This user's experience is typical of that in many plants where Celite Pressing Aids are used. Faster production, clearer juice, higher yields, less wear and tear on cloths and equipment are some of the important benefits obtained when these diatomite powders are added in small amounts to the pulp before pressing.

HOW CELITE PRESSING AIDS WORK:

The tiny Celite particles, open and porous in structure, interpose themselves between the particles of solid pulp matter. This opens up countless minute channels through which the juice can escape, freely and at lower pressure. More juice is thus extracted in less time. The drier cake is more easily removed and the cloths can often be reused without washing.

Celite Pressing Aids are used with practically all types of fruit products. No special equipment is needed and the benefits they assure will usually more than pay for the small amounts of powder required.

If You Filter:

Celite Filter Aids can bring you corresponding benefits in faster production, sparklingly clear juices, longer filtration cycles. They are available in 9 grades of particle fineness, each designed for a specific filtering requirement. A Celite Engineer will be glad to give you all the facts. *Reg. U. S. Pat. Off.

For further information, write Johns-Manville, Box 290, New York 16, N. Y.

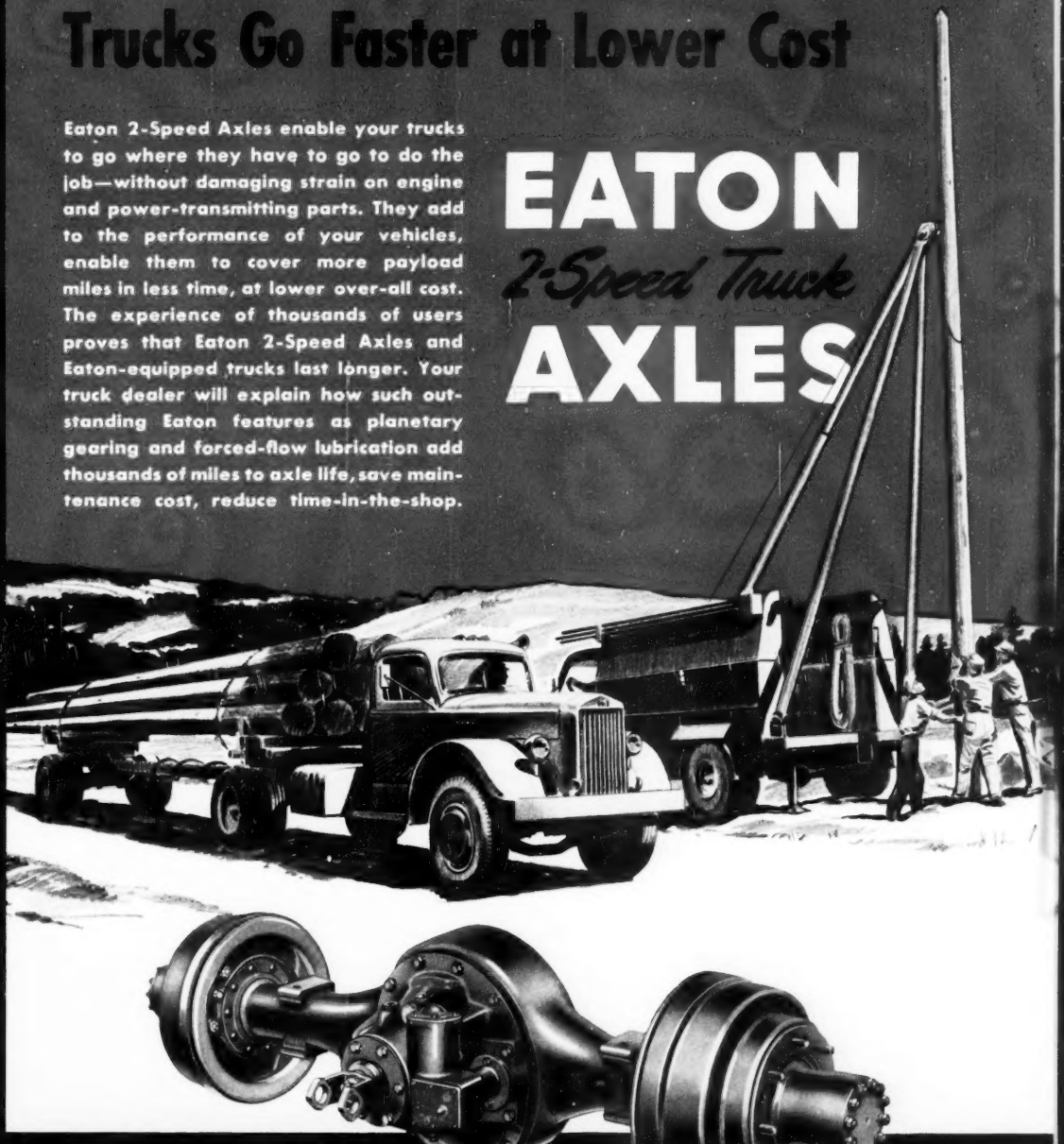
Johns-Manville CELITE

PRESSING AIDS

On the Highway or Off—
Trucks Go Faster at Lower Cost

Eaton 2-Speed Axles enable your trucks to go where they have to go to do the job—without damaging strain on engine and power-transmitting parts. They add to the performance of your vehicles, enable them to cover more payload miles in less time, at lower over-all cost. The experience of thousands of users proves that Eaton 2-Speed Axles and Eaton-equipped trucks last longer. Your truck dealer will explain how such outstanding Eaton features as planetary gearing and forced-flow lubrication add thousands of miles to axle life, save maintenance cost, reduce time-in-the-shop.

EATON
2-Speed Truck
AXLES



Axle Division

EATON MANUFACTURING COMPANY

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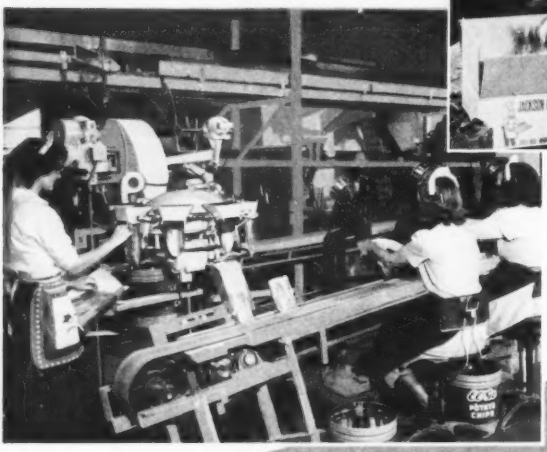
PRODUCTS: SODIUM COOLED, POPPET, AND FREE VALVES • TAPPETS • HYDRAULIC VALVE LIFTERS • VALVE SEAT INSERTS • JET ENGINE PARTS • ROTOR PUMPS • MOTOR TRUCK AXLES • PERMANENT MOLD GRAY IRON CASTINGS • HEATER-DEFROSTER UNITS • SNAP RINGS • SPRINGTITES • SPRING WASHERS • COLD DRAWN STEEL • STAMPINGS • LEAF AND COIL SPRINGS • DYNAMATIC DRIVES, BRAKES, DYNAMOMETERS

IN THE NEWS!

Automatic Weighing Machines

Versatile!

CANDY, cookie, and cracker manufacturers are most frequent purchasers of this model. Bags applied manually. Rigid containers handled either manually or automatically. Weight range is one-half to 16 ounces, net. Incorporates the exclusive Hy-Tra-Lec method of weighing. (Hy-Tra-Lec Weigher, Model M)



Fast!

TODAY'S number one choice where small and medium size bags are to be filled with potato chips and like products. Exceptionally fast. Bags are applied manually. Weight range varies with products. With potato chips it's one-half to three ounces. Design simplicity a definite superiority. (Hy-Tra-Lec Weigher, Model H)

Accurate!

CRACKERS weighed and filled into cartons at high speed with record accuracy. Completely automatic. System includes (1) a pre-filler which weighs and fills within 98% of desired weigh (2) a finish-filler which weighs and fills at single file rate to within 99-100% desired accuracy! Weight range is 6 to 16 ounces, net. (Hy-Tra-Lec Weighing System, Model CE)

Descriptive literature, user reports, and delivery schedules available and gladly supplied to dry product packagers. Save money with Hy-Tra-Lec's speed, accuracy, gentleness, and dependability. Get the Wright story now.

WRIGHT MACHINERY COMPANY

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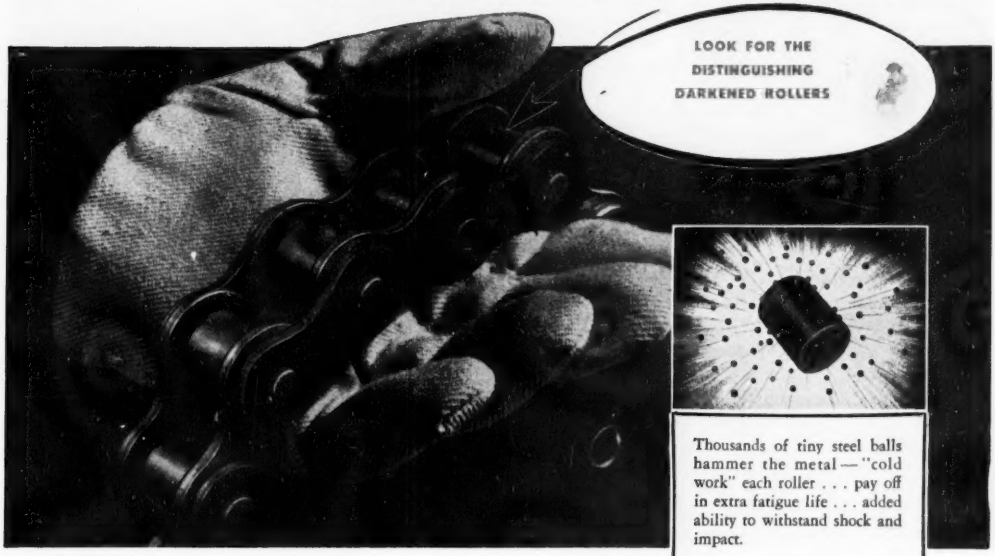
Here's how you can tell the chain with SHOT-PEENED rollers...



Thousands of tiny steel balls hammer the metal — "cold work" each roller . . . pay off in extra fatigue life . . . added ability to withstand shock and impact.

...the chain that has extra fatigue life

YES, you want to be sure you get shot-peened rollers on the next roller chain you buy. Shot-peening gives rollers the extra fatigue life needed to take repeated shock and impact loads.

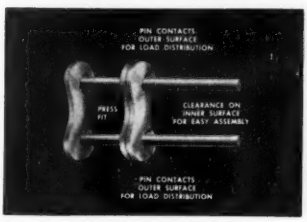
These chains are high in tensile strength, durable under severe loads, relatively light in weight and uniform in pitch. This accounts for their wide acceptance throughout industry for both drive and conveying purposes.

Thanks to constant research and precise manufacturing controls, every Link-Belt Precision Steel Roller Chain meets the highest standards for uniform strength. You get a positive, long-life drive — unaffected by heat, cold or moisture.

Link-Belt Roller Chain is available in single or multiple widths, in ⅜ to 3 in. single and double pitch. For all the facts, call your nearest Link-Belt office.

LINK-BELT

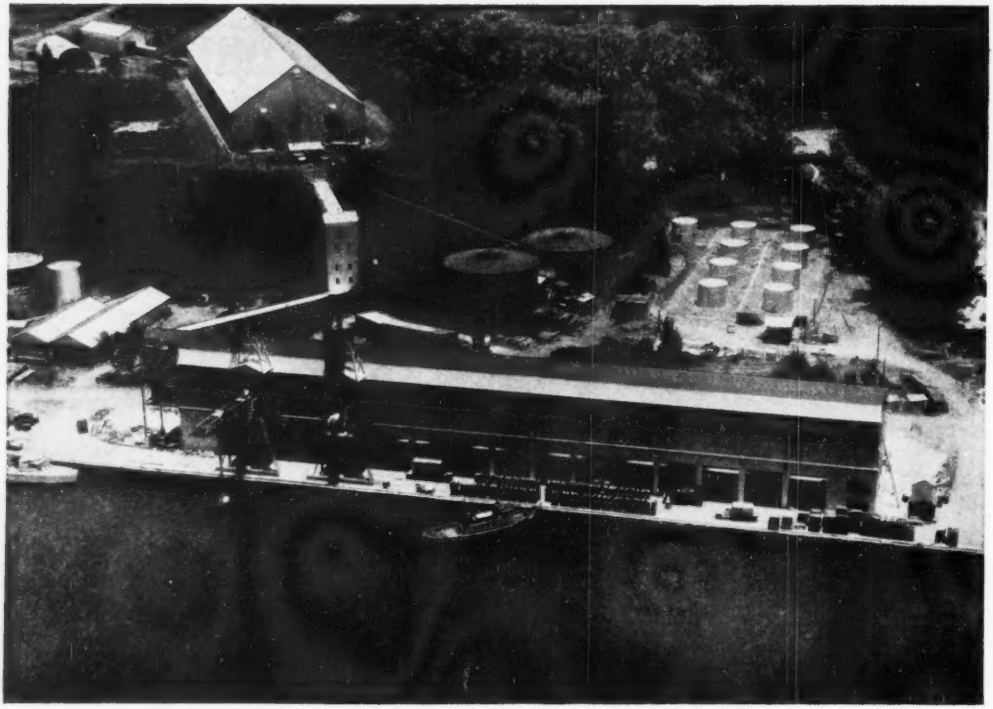
PRECISION STEEL ROLLER CHAIN



Easier coupling
and uncoupling without sacrificing load distribution

Patented E-Z Assembly feature of Link-Belt Precision Steel Roller Chain has won world-wide approval. Coupling and uncoupling of multiple width chains — right on the job — is far easier. There's absolutely no sacrifice of load distribution . . . no loss of the chain's remarkable performance. Press-fits between chain pins and middle bars have been modified. But full load carrying capacity across the entire width of the chain has been maintained.

LINK-BELT COMPANY: Indianapolis 6, Chicago 9, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8, Springs (South Africa). Offices, Factory Branch Stores and Distributors in principal cities. 12,332



SUGAR BY THE SHIPLOAD

—at Handling Costs Far Below Sugar-by-the-Bag

At this port facility S-A Belt Conveyors and centrifugal-action Boat Trimmers handle these operations: they store, reclaim, weigh and deliver bulk sugar into the holds of ocean vessels. Use of expensive bags, individually handled, is eliminated. Push button controlled S-A Equipment speeds all operations in achieving *lower handling costs per ton*.

In finding the best answer to every bulk materials handling problem, S-A engineers draw on accumulated experience of 50 years. It is likely they have already designed an installation similar to the one you need. The complete S-A line includes every type of bulk handling equipment.

Write for a free survey by an S-A engineer. No cost or obligation to you.

NAWILIWILI BULK SUGAR FACILITIES
Nawiliwili, Kauai, T. H.

Trailer dump trucks haul raw bulk sugar from the plantations to the port facilities. Sugar is stored, reclaimed and weighed and then delivered to the loading gantries on the pier . . . all by S-A Belt Conveyors. Bulk sugar is placed in the holds of ships by hinged boom conveyors and spouts. S-A centrifugal-action Boat Trimmer units fitted on the ends of the spouts, swivel to throw sugar to the far corners of the holds . . . fills cargo space quickly, completely and without hand trimming. S-A system handles 600 TPH.

1901-1951
50 years experience with bulk handling
STEPHEN S-A ADAMSON MFG. CO.
6 Ridgeway Avenue, Aurora, Illinois · Los Angeles, Calif. · Belleville, Ontario

DESIGNERS AND MANUFACTURERS OF ALL TYPES OF BULK MATERIALS HANDLING EQUIPMENT

Exide-Ironclad
BATTERIES
ARE YOUR BEST POWER BUY— AT ANY PRICE

They ASSURE high maneuverability of trucks . . . rapid, accurate handling of material . . . PROVIDE uniform rate of material handling with no unscheduled down time. SHOW lowest costs of operation, maintenance, repair, depreciation . . . inherently safe. Call in an Exide representative, and let him prove these facts.

THE ELECTRIC STORAGE BATTERY COMPANY
Philadelphia 2
Exide Batteries of Canada, Limited, Toronto

"Exide-Ironclad" *Reg. Trade-mark U. S. Pat. Off.*

With This NEW Improvement Niagara "No-Frost Method" puts you a big step ahead in trouble-free, automatic refrigeration or freezing

Niagara "No-Frost Method" keeps frost and ice COMPLETELY OUT of your cooling, chilling, freezing or cold storage.

It uses Niagara No Frost Liquid Spray to keep frost and ice from ever forming. It gives you, automatically, refrigeration with no defrosting, and full capacity NEVER cut down by ice building up progressively on refrigeration coils.

Now, a NEW design No Frost Liquid concentrator, using a new principle, takes away moisture as fast as it is condensed by evaporating it at low temperature—not boiling it away at high temperature. It has 14 times the capacity of the old method per dollar of investment—one concentrator will handle a battery of high capacity spray coolers.

This gives you more refrigeration at lower cost; less machinery in less space. You operate at high suction pressure, saving power and wear and tear on compressors.

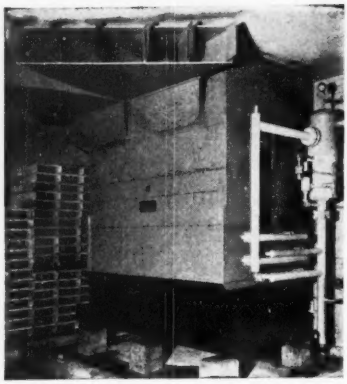
The extra capacity and lower cost both for equipment and operating makes this method advantageous for every type of refrigeration use—both for freezing and for moderate temperatures—for large "live" loads as in meat chilling or in fruit and vegetable pre-cooling—for rooms that are filled and emptied of product daily, such as milk rooms and terminal storage warehouses.

You get true trouble-free refrigeration . . . No brine . . . no salt solution . . . no dirt . . . no mess . . . It is entirely clean; you get rid of dirt and odors. You reduce both equipment and operating costs.

With Niagara "No-Frost Method" you easily keep constant temperature of products in your rooms, improve quality, get more production.

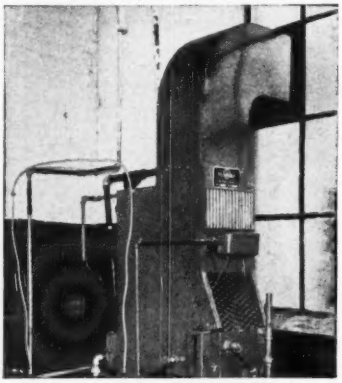
There are two series of concentrators: one, with evaporating capacity up to 6 gal. of water per hour, is economical for small freezing or hardening rooms, milk rooms, single room storage. The other, evaporating up to 36 gal. per hour, serves a battery of large coolers as in multiple floor cold storages, large chilling, freezing or pre-cooling plants.

For complete information write to the Niagara Blower Company, Dept. FI, 405 Lexington Avenue, New York 17, New York.



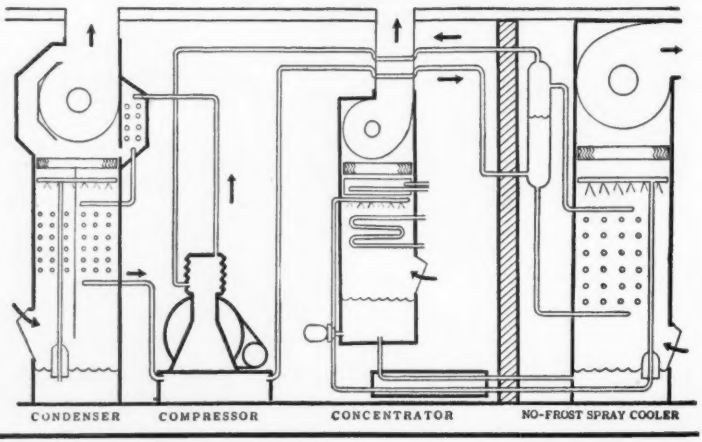
Niagara No Frost Spray Coolers
PATENTED

With the "No-Frost Method" you always get the full amount of refrigeration your compressor will deliver and for which you are now paying. If you need extra capacity, the Niagara "No-Frost Method" can help you get it with your present compressor.



Niagara No Frost Concentrator
PATENTED

No salt solution . . . No brine . . . The Niagara "No-Frost Method" gives you a clean system, clean rooms, clean equipment.



RULE OUT RANCIDITY!

Heyden

PROPYL GALLATE

antioxidant & stabilizer

FINE HEYDEN CHEMICALS

Bakers and other users of shortenings know that freshness and sweetness must be safeguarded until the last bit is used. This is no less true of other materials that may turn rancid.

Protection against rancidity in oils and fats is easily secured with Heyden Propyl Gallate. Effective in low concentrations, this powerful antioxidant prolongs shelf-life and stabilizes color, odor and taste.

Propyl Gallate is a neutral, white powder approved by the Bureau of Animal Industry for use in animal fats. It also prevents auto-oxidation in waxes, ethers, emulsions and kindred products.

• • •

Heyden Propyl Gallate is shipped in 200, 100, 50 and 25 lb. fiber drums. Technical literature and samples will be forwarded promptly upon request.

Serving Industry Through Finer Chemicals

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Chlorinated Aromatics • Creosotes • Formaldehyde • Formic Acid
Glycerophosphates • Guaiacols • Hexamethylenetetramine
Medicinal Colloids • Methylene Disalicylic Acid
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A WIDE RANGE OF EQUIPMENT TO HELP YOU DO A BETTER JOB

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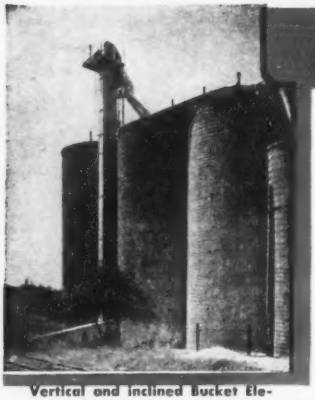
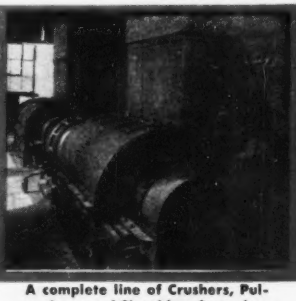


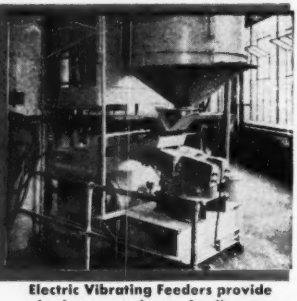
Vertical and inclined Bucket Elevators with spaced or continuous buckets mounted on chain or belt. A complete line of standards.

Belt Conveyors for handling a wide variety of loose, bulk material. Roller or ball bearing troughing (or flat) and return Idlers for belt widths from 14" to 60". Large capacities and a steady flow.

Spiral Conveyors will handle many kinds of material with clean, dustless operation. No return strand. Standard types — also many special designs and applications. Interchangeable with other makes — built to industrial standards.

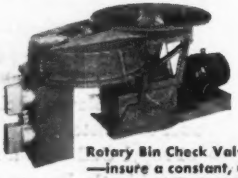


A complete line of Crushers, Pulverizers and Shredders for reducing most any kind of material to desired fineness.



Electric Vibrating Feeders provide absolute control over feeding operations. Open or closed pan, or tubular decks. Capacities from a few ounces up to many tons per hour.

Car Pullers for spotting from one to six cars. Two sizes.



Rotary Bin Check Valves —insure a constant, uninterrupted flow of fine flooding material to vibrating Feeders or WAYTROLS. Also Bin Level Indicators.

Rotary-type Feeder for feeding finely pulverized material. Also Spiral, Apron, Belt, Plate and electric-vibrating type Feeders.

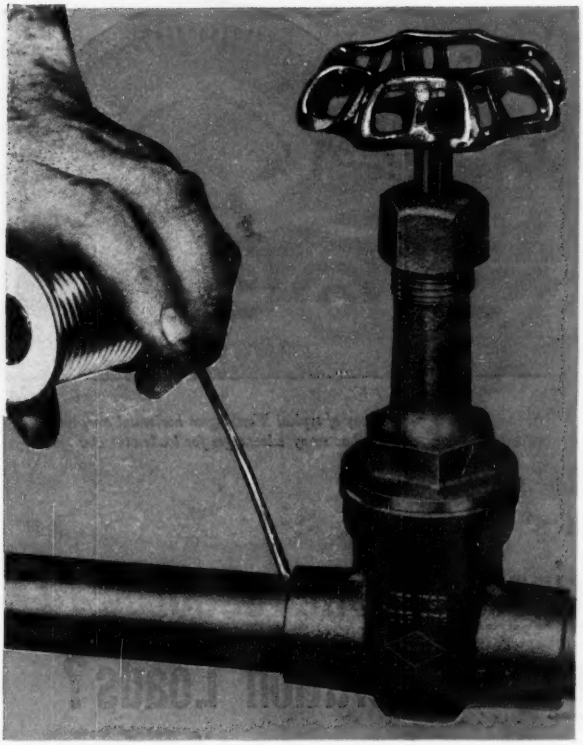
Low Head Barrel Packer for economy in packing operations. Reduces size of containers, increases capacity and cuts shipping costs. Also supplied with deck to provide conveying action during packing operations.

THE JEFFREY MANUFACTURING COMPANY

ESTABLISHED 1877

927 North Fourth St., Columbus 16, Ohio

Complete Line of Material Handling, Processing and Mining Equipment



For

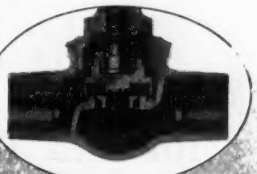
EASY INSTALLATION
POSITIVE CONTROL
LASTING ECONOMY
in copper line service

JENKINS *Solder-End* VALVES

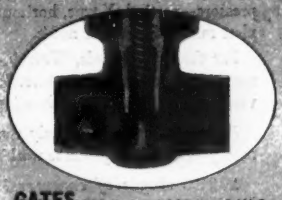
To speed installation in copper lines, you want a valve with an accurate fit to tubing—a valve that will not distort under the intense heat of soldering. And, because flexible tubing does not afford the rigid support of standard pipe, you want a valve that will withstand unusual strains in operation.

To give you Solder End Valves that meet *every* test in the toughest service Jenkins valve specialists designed them with an extra measure of rugged endurance, along with the dimensional accuracy and operating efficiency you expect in all valves of Jenkins quality.

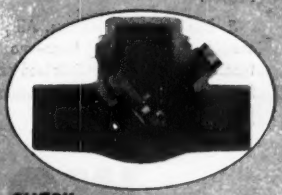
A new Folder, Form 198, describes the complete line of Jenkins Solder End Valves, shows construction details, and gives instructions for correct installation. Get your copy—see why so many economy-wise valve buyers specify *Jenkins*. Jenkins Bros., 100 Park Ave., New York 17. Jenkins Bros., Ltd., Montreal.



GLOBES 300 lbs. O.W.G. ¼" to 3" Fitted with Jenkins Renewable Composition Disc for any specified service.



GATES 225 lbs. and 300 lbs. O.W.G. ¼" to 3" With solid or split wedges, and fullscrew or traveling spindles.



CHECK 300 lbs. O.W.G. ¼" to 3" Regrinding. May be easily reground without removal from line.

GET THIS New FOLDER ON JENKINS Solder End VALVES

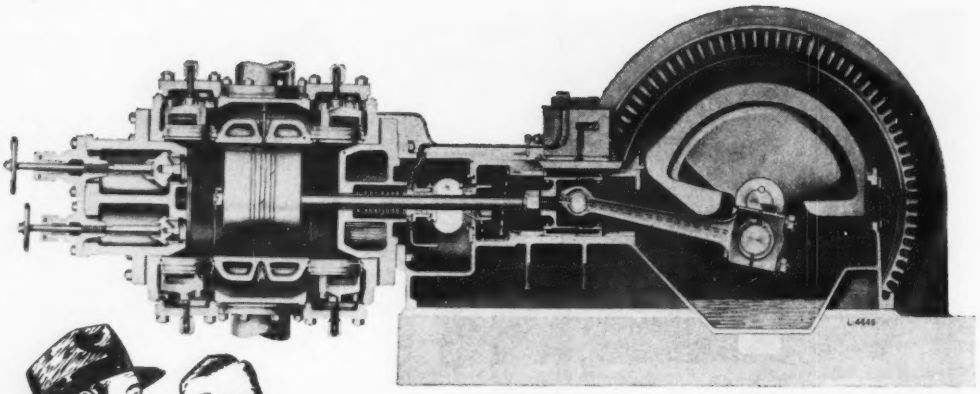
Gives complete description, dimensions, and instructions for installation. Ask your Jenkins Distributor or write for Form 198. Jenkins Bros., New York 17.

JENKINS VALVES

LOOK FOR THE DIAMOND MARK

TRADE JENKINS MARK

Jenkins Bros.



Cutaway of typical Worthington horizontal compressor which has many advantages for loads over 450 tons.

Why a Horizontal Compressor for the Heavier Refrigeration Loads?

Worthington, unlike other refrigeration compressor manufacturers, makes *all three* types of ammonia compressors—vertical, Y-type, horizontal—to cover the complete range of customer needs.

For the *heavier* loads, Worthington offers a complete range of *horizontal* compressors. Why? What are the advantages of horizontals for heavier loads?

1. More work done. Only the horizontal is double-acting—that is, the piston is working on both strokes.

2. Two stages of compression in one machine. For low-temperature work, the horizontal can have two stages of compression—no second or booster compressor needed.

3. Easier maintenance. All parts of compressor accessible from working floor—no "high altitude" maintenance. Pressure is maintained only in the cylinder—so frame can be opened for maintenance without losing compression or the refrigerant.

4. More flexibility. Horizontals can be installed duplex—that is, two cylinders on different frames operated by the same driver.

Special reasons for using Worthington horizontal compressors include:

1. **wide range of sizes up to 1000 tons**
2. **double-seal housing (optional)**
3. **variable capacity control (optional) of various types, including automatic**
4. **famous Worthington Feather* valves—simplest, most efficient ever made.**

Investigate *more worth with Worthington.* Consult Classified Telephone Directory for nearest Worthington distributor. Worthington Pump and Machinery Corporation, Air Conditioning and Refrigeration Division, Harrison, N. J., specialists in air conditioning and refrigeration for more than 50 years.

*Reg. U. S. Pat. Off.

A.1.39

WORTHINGTON

AIR CONDITIONING AND REFRIGERATION

THE MOST COMPLETE LINE...ALWAYS THE CORRECT RECOMMENDATION

2 OF THE BIGGEST REASONS WHY BAKERS SAVE WITH flo-Sweet LIQUID SUGAR!

1

flo-Sweet IS EASIER TO HANDLE!

Now that Flo-Sweet® has solved the problem of controlling the temperature of the batter, bakers can take advantage of the terrific savings in space, congestion and costly manpower that only liquid sugar can give. For years, bottlers and ice cream makers—whose sugar handling problem is far less complex and costly than the baker's—have saved with economical, easy-to-handle liquid sugar. It's ten times as important to you!—A Flo-Sweet liquid sugar installation delivers sugar to every mixing bowl at the turn of a tap . . . makes accurate measuring and mixing easy as pie—gives you 100% product perfection from every batch!

2

flo-Sweet IS TAILORED TO YOUR NEEDS!

Flo-Sweet provides the percent of invert you ask for at regular sucrose prices—saves important time and labor costs. No need to buy invert in drums. No messy invert mixing job. Thus, Flo-Sweet simplifies big plant usage of sugar in general and invert in particular . . . makes it possible for smaller plants to use invert on an economical basis. Just tell us how much invert you need and you'll get it ready-mixed in your Flo-Sweet *at no extra cost*, and absolutely free of the waste and mess of single-batch mixing!

NOTE: *If you want the savings, service, and product improvement enjoyed by the profit-minded bakers who use Flo-Sweet Liquid Sugar, write us for details today.*

flo-Sweet

Manufactured only by

REFINED SYRUPS & SUGARS, INC.

Yonkers 1, New York

PIONEERS IN LIQUID SUGAR FOR SAVINGS, SANITATION AND SERVICE

The strongest frozen foods container on the market!

THE NEW Canco Frozen Foods Container is the sturdiest yet developed in the industry. With its rigid fibre board body and metal ends, the composite container defies abuse. And it has these additional features:

1. Flatter profile! There is no "neck in" of body stock to the metal ends. Therefore, the new Canco containers are easily stacked on each other.

2. 2-way protection for your product! The odorless, tasteless paraffin coating on both sides of the body wall protects the contents two ways. It repels external water vapor, and it guards against dehydration from within.

3. Automatic filling and closing! The Canco fibre board container was the first specifically designed for automatic filling and closing. This means more speed and economy for you.

4. Consumer-retailer acceptance! Due to its handsome construction and non-leak features, the Canco Frozen Foods Container has proved highly popular with both consumer and retailer.

You see to it that your products are handled in the best way possible from planting to your plant.

You can guarantee continued protection from plant to consumer by packaging all your products in the best frozen foods container on the market—the *new* Canco Frozen Foods Container.

1901—50TH ANNIVERSARY—1951

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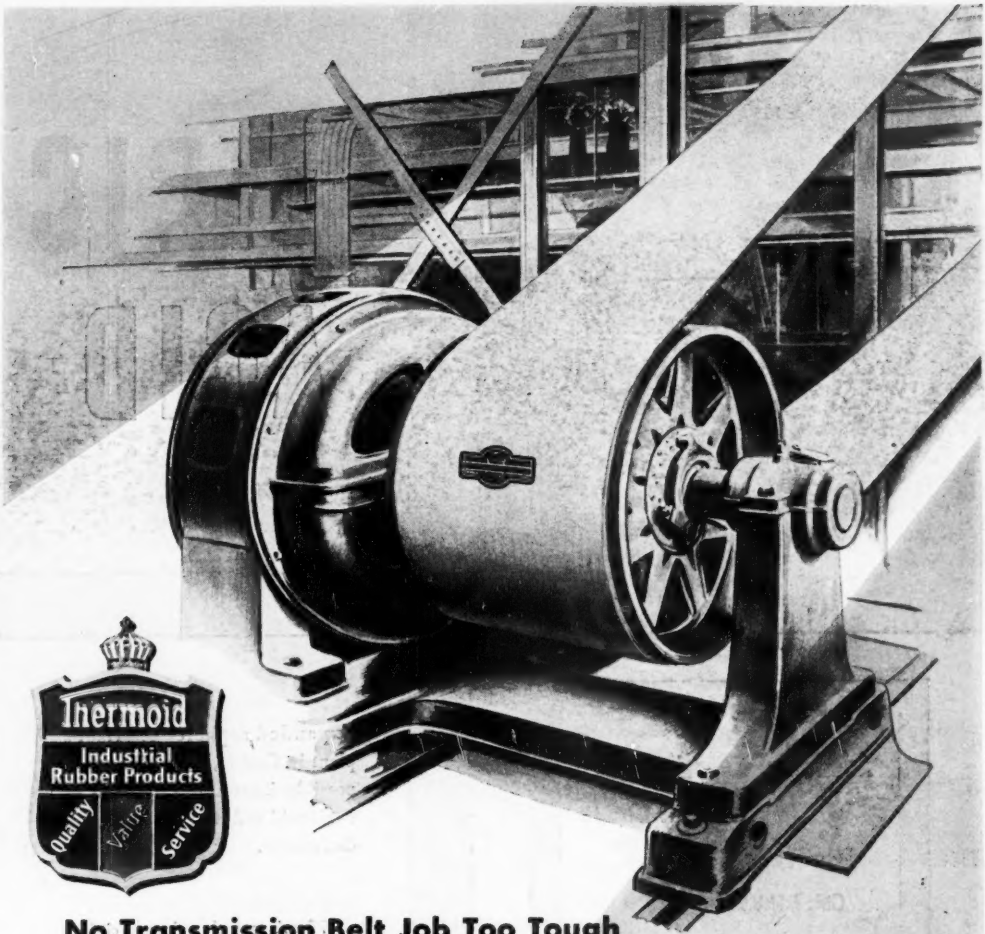
AMERICAN CAN CO.

New York • Chicago • San Francisco • Hamilton, Canada



Thermoid
Industrial Rubber Products
Quality Value Service

No Transmission Belt Job Too Tough ... For Thermoid

Have you some really tough transmission jobs—regular belt killers? They won't be too tough for a Thermoid Transmission Belt. Let your Thermoid Distributor prove that by furnishing exactly the right belt for your job.

For general service he will offer "400", the all-purpose belt that will satisfactorily service all normal operating requirements.

For severe service, or for high speeds with small pulleys, he will recommend Thermoid High Speed "R", made with extra strong, hard 35-oz. duck and top grade rubber. Where there are oil or fumes injurious to rubber, he will recommend Thermoid High Speed "N", with Neoprene friction and skim. Each type is practically custom-built for the service for which it is recommended.

Here's The Book That Will Answer Many of Your Questions

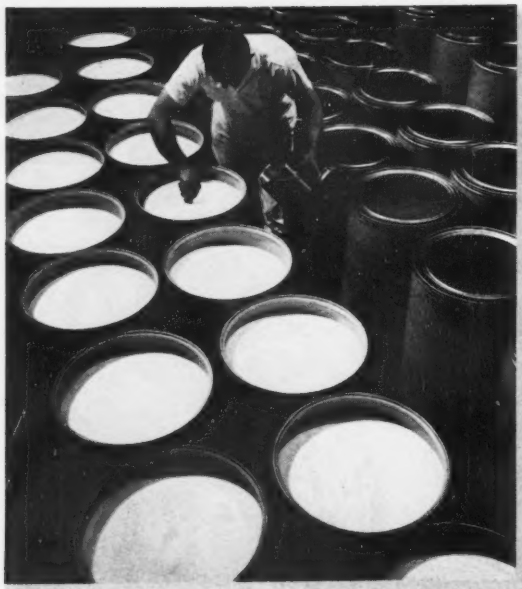
Ask for your free copy of Technical Bulletin No. 3678. It contains practical information, charts, tables and diagrams which will help you select the right transmission belt for your requirements.

Thermoid

Conveyor & Elevator Belting • Transmission Belting
F.H.P. & Multiple V-Belts • Wrapped & Molded Hose

Rubber Sheet Packings • Molded Products
Industrial Brake Linings and Friction Materials

Thermoid Company • Offices & Factories: Trenton, N. J., Nephi, Utah



CITRIC ACID

Additional Supplies Now Available

- Citric Acid U.S.P.
- Citric Acid Anhydrous
- Sodium Citrate U.S.P.
- Sodium Citrate Anhydrous
- Sodium Citrate VIII Granular

Expanded capacity at Pfizer's plant in Groton, Conn., has made possible increased production of citric acid and its many important derivatives.

Pfizer's recently enlarged citric acid plant at Groton, Conn.

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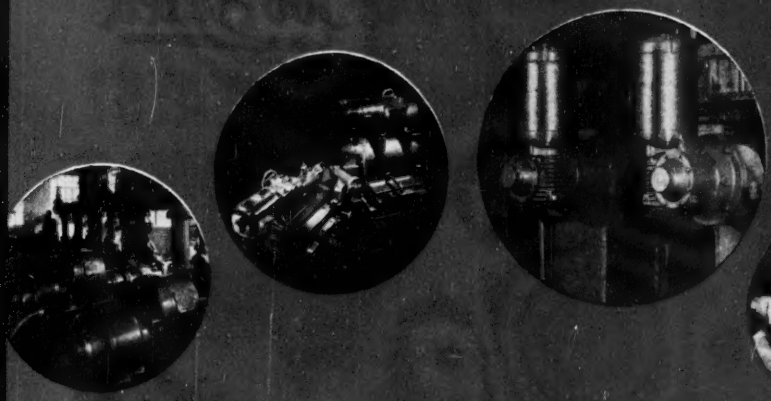
Manufacturing Chemists for Over 100 Years

Write for technical data and prices to Chas. Pfizer & Co., Inc., 630 Flushing Ave., Brooklyn 6, N. Y.; 425 North Michigan Ave., Chicago 11, Ill.; 605 Third St., San Francisco 7, Calif.



Time and money saving ideas of how you too can take advantage of Master's unusual ability to provide the RIGHT horsepower, the RIGHT shaft speed, the RIGHT construction features, the RIGHT mounting . . . all combined into one compact power package.

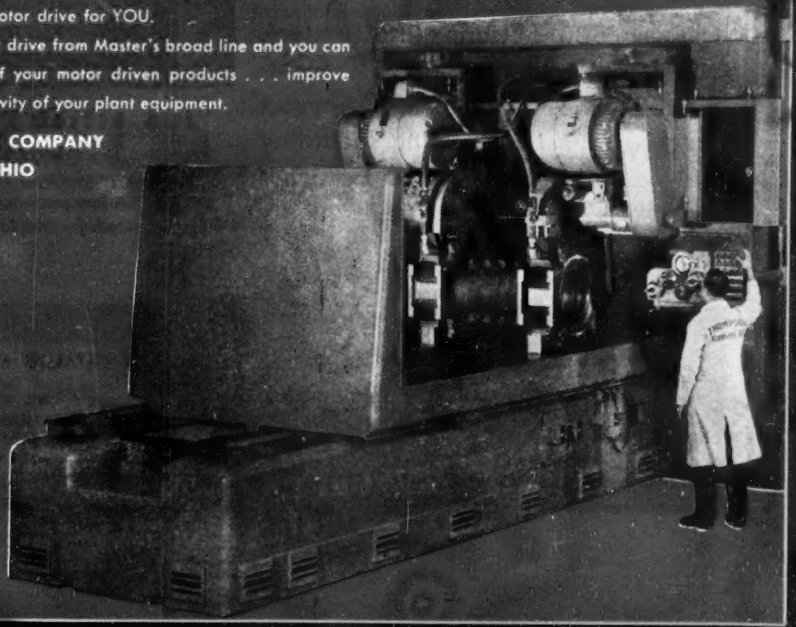
Don't, put up with make-shift assemblies when you too may be enjoying these advantages. Master Motors, available in thousands and thousands of types and ratings (up to 150 HP) give you a selection you can get nowhere else.

Open, enclosed, splash-proof, fan-cooled, explosion-proof . . . horizontal or vertical . . . for all phases, voltages and frequencies . . . in single speed, multi-speed and variable speed types . . . with or without flanges or other special features . . . with 5 types of gear reduction up to 432 to 1 ratio . . . with electric brakes . . . with mechanical variable speed units . . . and for every type of mounting . . . Master has them all and so can be completely impartial in helping you select the one best motor drive for YOU.

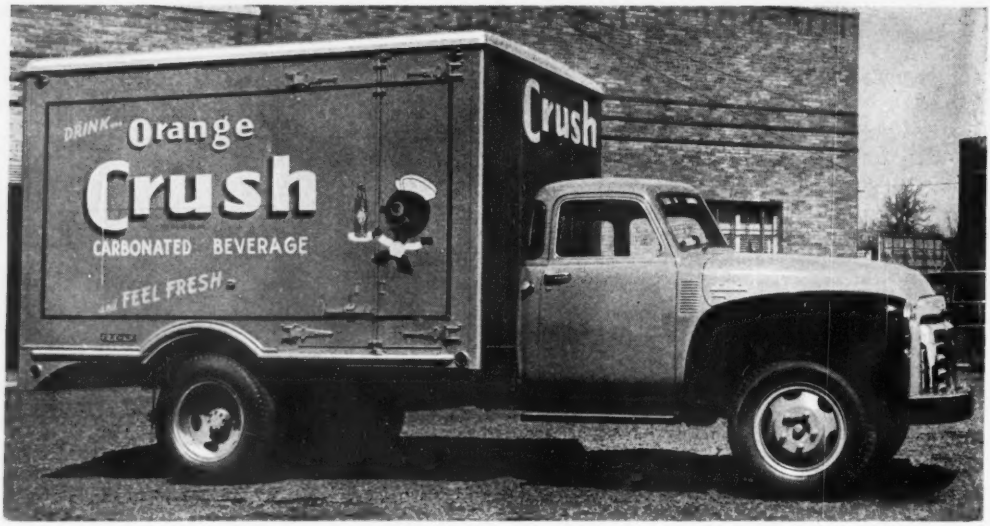
this may give you ideas

Select the RIGHT power drive from Master's broad line and you can increase the saleability of your motor driven products . . . improve the economy and productivity of your plant equipment.

THE MASTER ELECTRIC COMPANY
DAYTON 1, OHIO

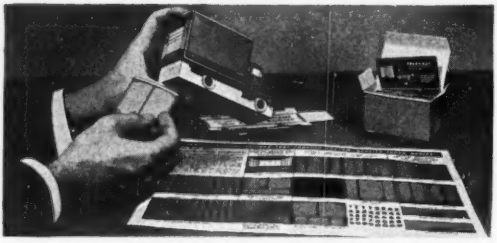


FRUEHAUF VAN BODIES are "Job-Fitted" to YOUR BUSINESS...OVER 500 WAYS!



BEFORE you consider any other Truck Body today, you owe it to yourself to investigate these "BIG 5" FRUEHAUF BUYING ADVANTAGES:

1. Over 500 options. 2. All steel, "Unit-Built" construction. 3. Straight-frame or wheelhousing . . . all popular lengths. 4. Fast assembling, mounting and painting service at 80 Branches coast-to-coast. 5. Custom-built quality at production-line prices.



"JOB FITTED" IN MINIATURE!

Fruehauf Truck Body Model Kit lets you make up your own unit—complete with all options—*before it's built!* A few seconds is all it takes. Ask for your model kit today—*free* to any prospect upon request.

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Since 1936...

"Continuous service without a break-down"

Back in 1936, officials of this large meat packing plant specified stainless steel in new equipment for its sanitation and resistance to corrosion. The equipment was fabricated of Republic ENDURO Stainless Steel. Not one single failure has occurred. All items have withstood wear and corrosion very well. Maintenance has been low. Replacement has been unnecessary. Critical materials have been saved—a factor which will be of even greater importance in the days ahead.

ENDURO Stainless Steel is your right choice for all food-contacting surfaces. It's so easy to clean . . . and to keep clean. At the end of each working period, the ENDURO chute shown here is simply washed down with hot water and purged with live steam. Then, it sparkles like new . . . free from any trace of rust or corrosion. Its smooth surface offers no foothold for food particles. It does not contaminate metallically . . . safeguards food color, flavor, purity.

Republic's metallurgical, technical and engineering staffs are ready to help you realize the utmost production from your present ENDURO equipment . . . and to advise you on the most suitable grades for your new equipment purchases. This service is confidential, and without obligation. Just write:

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Export Department: Chrysler Building, New York 17, N.Y.

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Other Republic Products include Ex-L-ite Tin Plate, Pipe, Sheets, Bolts and Nuts, Electrunite Tubing, Niles Barrels and Drums

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serves the
ENTIRE FOOD INDUSTRY

Sterwin helps every branch of the Food Industry to provide tastier, more nutritious and more attractive food products for America's housewives.

Leading food processors depend on these tested and proven Sterwin products to insure the purity, uniformity, taste, appearance and nutritional value of their products.

ZIMCO® — Brand of Pure Lignin Vanillin—used by leading flavor suppliers and by the confectionery, ice cream, bakery, soft drink and other branches of the Food Industry.

PARAKEET — Brand of Certified Food Colors —adds eye and sales appeal to all types of food products.

B-E-T-S® — The *Original* Food-Enrichment tablets—add important vitamins and food iron to bread, macaroni and other cereal food products.

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OXYLITE® — A highly efficient and economical flour bleaching agent.

DELTAXIN® — Pure crystalline vitamin D_2 for fortification of milk and other food products.

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ASCORBIC ACID (Vitamin C)—Fortifies fruit juices, vegetables, dairy products, beverages and confections. Protects flavor and color of frozen fish and fruit.

TRIDEE® (brand of vitamin D_3) and **RIBOFLAVIN MIXTURE**—Fortify poultry feeds—increase egg production.

SANITIZE YOUR PLANT— with ROCCAL®—The *Original* Quaternary Ammonium Germicide. A powerful germ-killer—can be used for every equipment sanitizing job throughout the Food Industry.

U. S. P. VITAMINS AND AMINO ACIDS IN BULK

There is a Sterwin Technically-Trained Representative in your area. Let him show you how you can put Sterwin products, service and research to work in your plant. Or write direct to Sterwin Chemicals Inc., 1450 Broadway, New York 18, N. Y.

BRANCH OFFICES: Atlanta, Boston, Buffalo, Chicago, Dallas, Kansas City (Mo.), Los Angeles, Minneapolis, Portland (Ore.), St. Louis.

Sterwin Chemicals INC.

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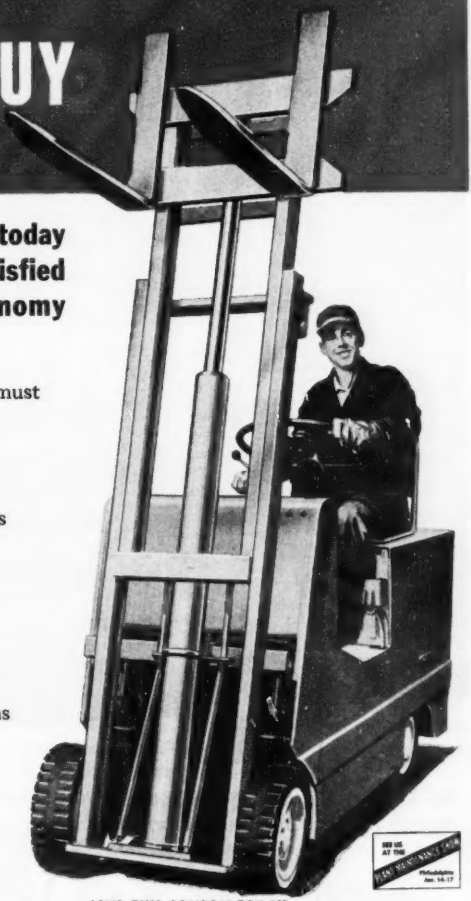
Distributor of the products formerly sold by Special Markets-Industrial division of Winthrop-Stearns Inc., and Vanillin Division of General Drug Company.

THE BIG 89% TELLS YOU WHY A YALE ELECTRIC TRUCK IS YOUR BEST BUY



89% of the Yale Electric Trucks sold today are bought by previous users...so satisfied with Yale performance and Yale economy that Yale is their choice again.

•Seeing that extraordinary record—you'll say these must be extraordinary trucks. And they are!

They bring to your materials handling problems new shortcuts—new savings in man-hours—new opportunities to answer today's stepped up demands for increased production and faster deliveries.

In many businesses Yale Electric Trucks are completely amortized in a relatively short time—and then pay for themselves many times over during their long years of service.

Rugged Yale quality—built into every part—explains the service these trucks give even in the toughest jobs . . . even when working on round-the-clock schedules that would knock out trucks of less durable construction.

Ask for complete details about Yale Electric Trucks—and their industry-wide record of satisfied users.

YALE & TOWNE

The Yale & Towne Manufacturing Co., Philadelphia 15, Pa.

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The Yale & Towne Manufacturing Co., Dept. 4610
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I am interested in cutting my materials handling costs.

☐ Please have your local representative call on me.
☐ Please send me free detailed literature.

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In Canada write: The Yale & Towne Manufacturing Company, St. Catharines, Ontario

YALE GAS AND ELECTRIC INDUSTRIAL TRUCKS • YALE WORKSAVERS • YALE HAND TRUCKS • YALE HAND AND ELECTRIC HOISTS

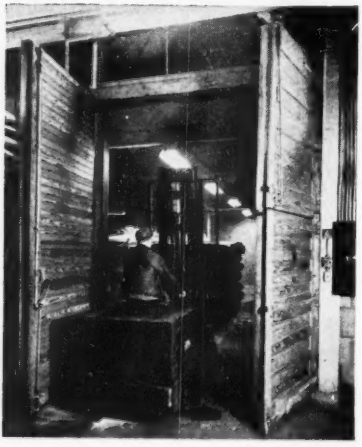
JAMISON Doors Open Wide at

to speed materials handling

CANADA DRY

This double cold storage door with an opening 9′ x 12′ permits the entry of loaded fork lift trucks and the moving of equipment into the refrigerated processing space. For entry of personnel, the lower part of the right hand door can be opened without opening the rest of the door.

Whether you have unusual size requirements such as those illustrated or merely require a standard cold storage door, there is a Jamison door to fit your needs.



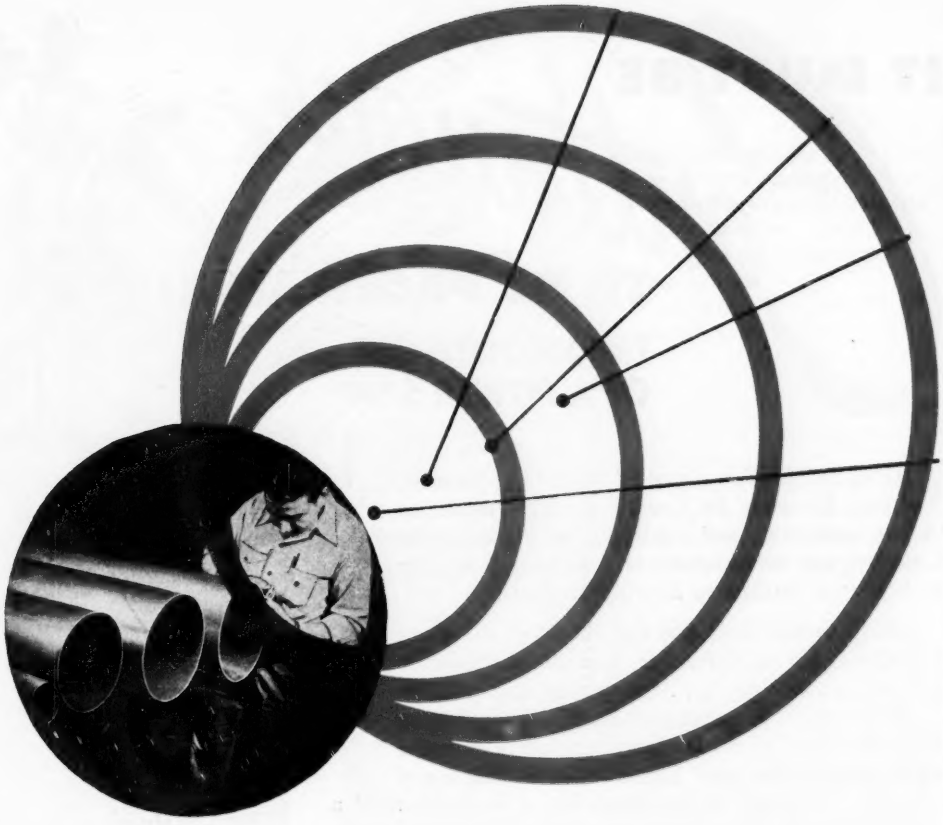
For full information on the Jamison line of cold storage doors, write for Catalog 175.

JAMISON

HAGERSTOWN, MARYLAND, U. S. A.

The leader for over 50 years

JAMISON COLD STORAGE DOOR CO. • HAGERSTOWN, MD., U. S. A.



engineers who design for long life specify TRENTWELD

Here are 7 reasons why TRENTWELD is better

1. Largest variety of sizes—4½" to 30" inclusive
2. Finished tubing... machine-formed, machine-welded, machine-sized for uniformity
3. Made in a *tube* mill by *tube* experts
4. Made from tested cold rolled sheets . . . completely fused into finished tubing *without* added rod metal
5. No zone of weakness for corrosion to attack
6. Uniform section, metallurgically correct
7. Available for fabrication with any fittings

Trentweld Large Diameter (4½" to 30") Stainless Steel Tubing should not be compared to rolled up and hand welded sheets: Trentweld tubing is machine formed and machine welded without metal added. The weld is fused to the parent metal by an exclusive Trent development. That's what makes the difference, and that's why more and more fabricators, designers and manufacturers of all types of processing equipment are turning to Trent for their tubing requirements.

When you do business with Trent, you get top quality tubing PLUS engineering assistance to put stainless tubing to work in your application . . . better! Write for Trentweld Data Bulletin and tell us the application you have in mind.

TRENTWELD STAINLESS STEEL TUBING

TRENT TUBE COMPANY, GENERAL SALES OFFICES, EAST TROY, WISCONSIN

(Subsidiary of Crucible Steel Company of America)

IT MUST BE *Continuous* TO BE PROFITABLE!

THE SMOOTH CUT OF A POWER SAW . .

CONTINUOUS is a pay-off word in processing, too. By using De Laval centrifugal machines to put separating and clarifying on a continuous basis, you can save minutes or even hours once lost with inferior settling or filtering methods.

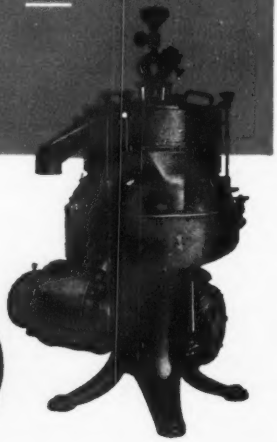
Many factors influence the choice of the right centrifuge for a particular application. Specific gravity . . . viscosity . . . the quality and quantity of solids present in one or both liquids . . . all of these play important parts. De Laval engineers have the right machine for ***each*** job, whether it calls for a machine for separating a few gallons of a liquid mixture or a "Nozzle-Matic" Separator capable of handling 6000 gallons per hour (or even more) of certain fluids.

Consult De Laval. You may find that their engineers have already experimented with some problem quite similar to yours.

MACHINES FOR EVERY SEPARATING SERVICE

1. CONTINUOUS SEPARATION of two liquids
2. CONTINUOUS CLARIFICATION of one or two liquids
3. CONTINUOUS SEPARATION of two liquids plus the continuous removal of solids from one or both

Which Will Speed Up Your Process?



De Laval

• ***Write for complete information.***

THE DE LAVAL SEPARATOR COMPANY
165 Broadway, New York 6 427 Randolph St., Chicago 6
DE LAVAL PACIFIC CO., 61 Beale St., San Francisco 5
THE DE LAVAL COMPANY, Limited, Peterborough, Ont.

CONTINUOUS
SEPARATION AND CLARIFICATION WITH CENTRIFUGALS

Congratulations to the Food Industry of America

Enriched foods mean better living for the American people. Ten years ago, when American millers and bakers introduced enriched flour and bread, they launched a new era in nutrition.

Since then, faith in the Enrichment Program has been reaffirmed many times. The human values of enriched foods have been factually established in terms of higher health levels and improved mental and physical vigor.

As we enter the second decade of Enrichment, Merck salutes the Baking and Milling Industries of America for this accomplishment.

MERCK VITAMIN PRODUCTS FOR ENRICHMENT AND FORTIFICATION:

VITAMIN B_1
Thiamine Hydrochloride (*Vitamin B_1 Hydrochloride*)
Thiamine Mononitrate (*Vitamin B_1 Mononitrate*)

RIBOFLAVIN (*Vitamin B_2*)

NIACIN (*Nicotinic Acid*)

ASCORBIC ACID (*Vitamin C*)

Merck Enrichment Ingredients for Millers, Bakers, Cereal and Macaroni Manufacturers —Merck Vitamin Mixtures for Flour Enrichment—Merck Bread-Enrichment Wafers—Merck Vitamin Mixtures for Corn Products Enrichment—Merck Vitamin Mixtures and Wafers for Macaroni Enrichment.

Merck is Proud to Have Played a Part in the Enrichment Program

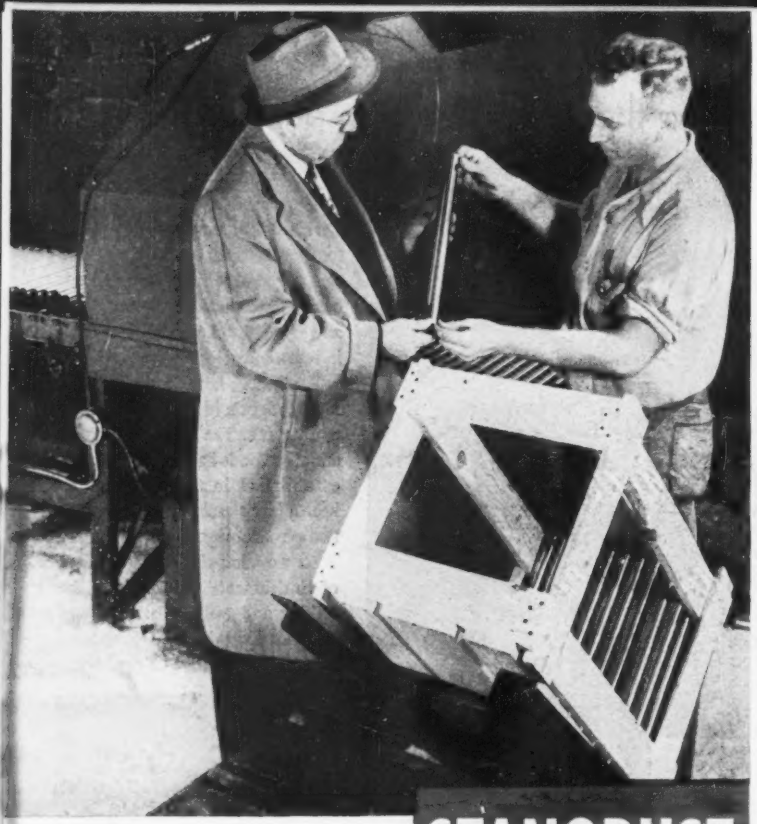
For several years before the birth of Enrichment, Merck research and production staffs had been at work on the synthesis and manufacture of thiamine, riboflavin, niacin, and other pure vitamins. When they were needed for the Enrichment Program, as well as for general food fortification, Merck was ready.

We are proud to have been associated with the food industry throughout these ten historic years of Enrichment.

MERCK VITAMIN PRODUCTS

For Enrichment and Fortification

MERCK & CO., INC.
Manufacturing Chemists
RAHWAY, NEW JERSEY
In Canada: MERCK & CO. Limited—Montreal



STANORUST
REG. U. S. PAT. OFF.
Rust Preventives

A clear case of rust prevention

● Without a protective coating, these ground finish steel tubes showed rust marks even before the customer could assemble them. A heavy black oil type coating proved difficult and messy to apply, resulted in an unattractive product, and called for a cleaning operation on the part of the customer.

That was the situation at Central Steel Tube Co., Clinton, Iowa, when a Standard Oil lubrication specialist recommended STANORUST Rust Preventive No. 4-V. Tested and approved, STANORUST was put to work.

Now, these same parts are easily and automatically sprayed after grinding. STANORUST No. 4-V leaves a slightly oily, transparent coating that shows the ground finish to advantage, yet allows handling of the parts without fear of fingerprint corrosion. Shipped to the customer, they arrive bright and rust-free, ready for assembly without removal of the protective coating.

STANORUST No. 4-V provides exactly the degree of protection required in this case. It is one of eight grades in the STANORUST line . . . one of which is the answer to your own rust prevention problem. For details, call on your Standard lubrication specialist. Contact the Standard Oil Company office in your area, or write:

Standard Oil Company, 910 S. Michigan Ave., Chicago 80, Ill.

What's your problem?

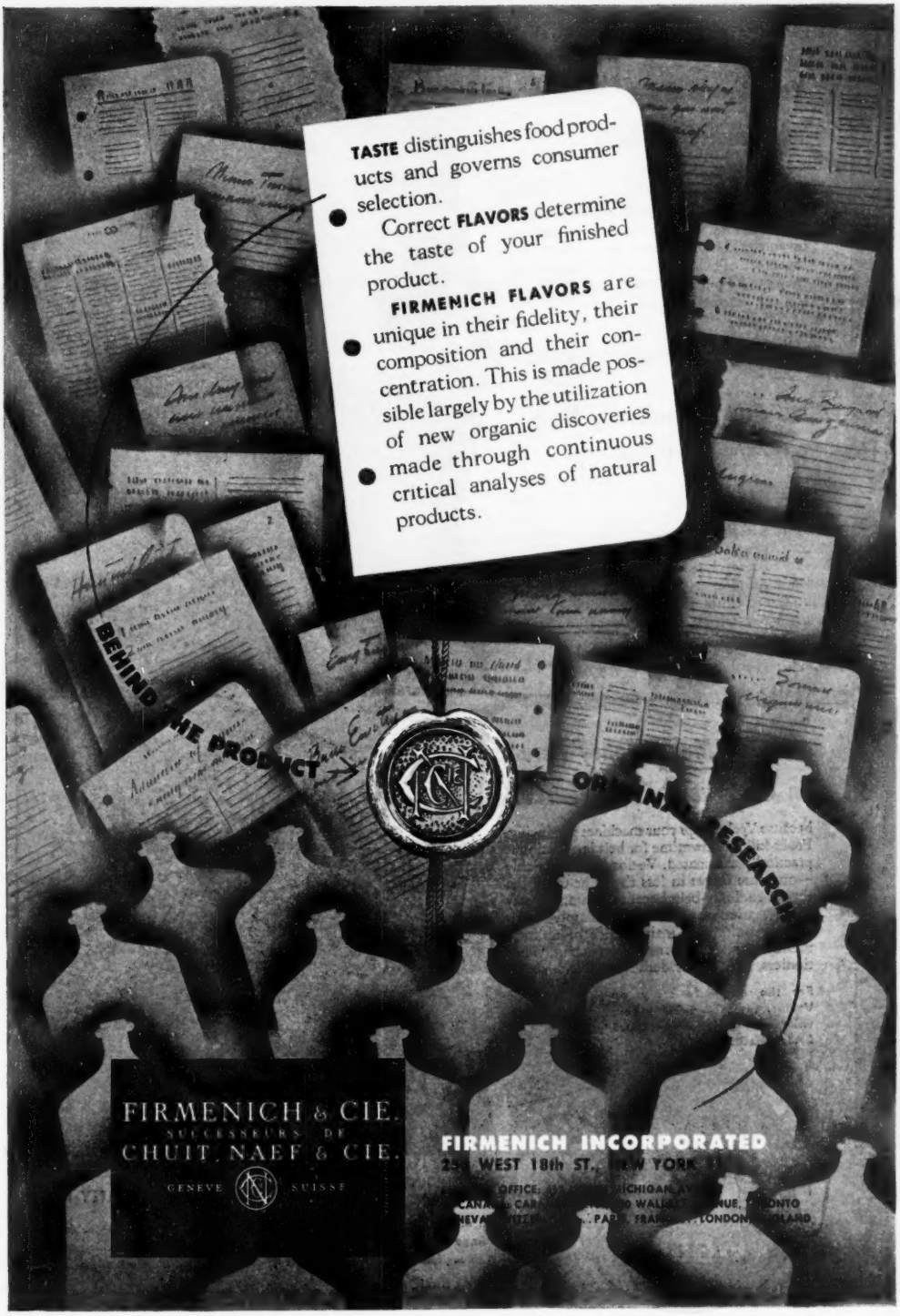
E. J. Newel, who makes his headquarters at Standard's Des Moines office, is the lubrication specialist who helped Central Steel Tube Co. put an end to rust prevention problems through the use of STANORUST No. 4-V.

Throughout the Midwest there is a corps of such specially trained, experienced lubrication specialists ready to give you prompt, on-the-spot help with any lubrication problem. Each of these men has been carefully trained in a Standard Oil Lubrication Engineering School to supplement his own background of practical experience. It's easy to get the services of a lubrication specialist—just phone or write to your local Standard Oil Company office. When he stops by to see you, ask him about the following quality Standard products.

STANOIL Industrial Oils—This multi-purpose line of oils provides cleaner operation of hydraulic units, supplies effective lubrication in compressors, gear cases, and circulating systems. One or two grades can replace a wide variety of special oils and lubricants.

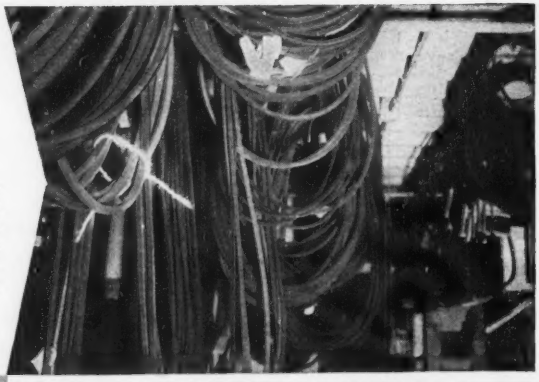
SUPERLA Greases—Available in lime soap and soda soap types, SUPERLA Greases cover a wide range of applications. These products are comparable in quality to the highest type of special greases but are as readily available and economical as ordinary cup greases.

STANDARD OIL COMPANY (STANDARD) *(Indiana)*


TASTE distinguishes food products and governs consumer selection.
Correct **FLAVORS** determine the taste of your finished product.
FIRMENICH FLAVORS are unique in their fidelity, their composition and their concentration. This is made possible largely by the utilization of new organic discoveries made through continuous critical analyses of natural products.
BEHIND THE PRODUCT
ORGANIC RESEARCH
FIRMENICH & CIE.
SUCCESSEURS DE
CHUIT, NAEF & CIE.
GENEVE SUISSE
FIRMENICH INCORPORATED
WEST 18th ST.,

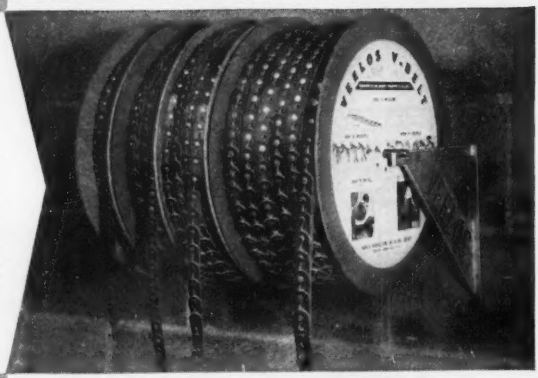
You Waste Money Here with Endless V-Belts...

because it takes *extra* dollars to keep a complete stock of different sizes of endless v-belts . . . *extra* dollars to provide adequate storage space . . . *extra* dollars to maintain an accurate inventory control . . . and *extra* dollars in an inventory of belts that may deteriorate before they can be put into service.



but You Save Money Here with Veelos V-Belt...

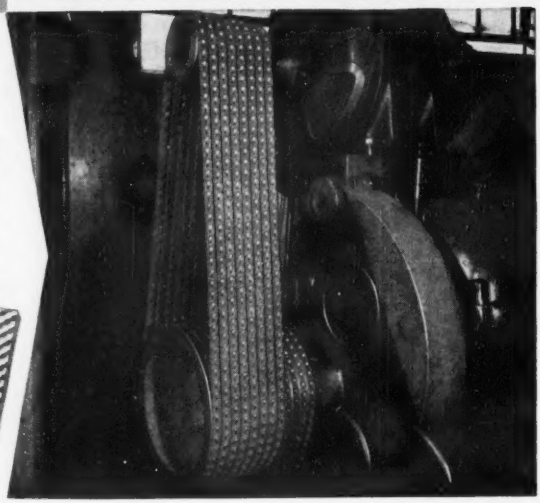
because these 4 reels of Veelos *adjustable* v-belt in the O, A, B and C widths will replace up to 316 sizes of endless v-belts. Veelos on reels is easy to store on the wall or floor . . . easy to control, for a glance tells you stock on hand. And Veelos holds inventory investment dollars to a minimum while providing *the right size v-belt when you need it*—without delay, without deterioration.



and You Make Money Here on Continuous Production...

because Veelos *keeps* your machines producing. Profit-killing downtime for belt installation is practically eliminated. Veelos installs quickly —on some drives in less than one-tenth the time of endless v-belts because it is unnecessary to dismantle outboard bearings. Simple adjustment permits easy maintenance of uniform tension on all belts . . . assures constant, vibrationless, full power delivery.

For the complete story on Veelos, the adjustable v-belt, write for your copy of the VEELOS DATA BOOK.



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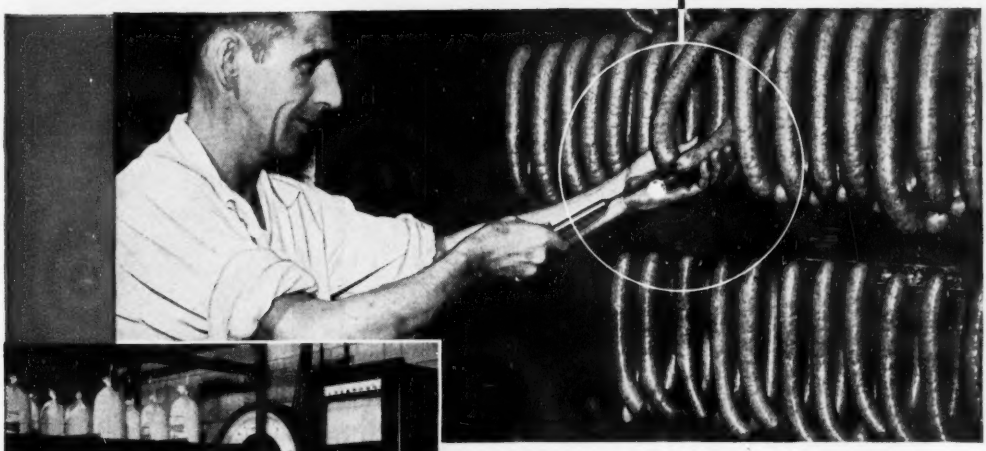
ADJUSTABLE TO ANY LENGTH • ADAPTABLE TO ANY DRIVE

Made in all widths in three types: regular, oil-proof, static conducting. Also double V in A and B. Package on reels in 100-foot lengths. Sales engineers in principal cities; over 350 distributors throughout the country. VEELOS is known as VEELINK outside the United States.

MANHEIM MANUFACTURING & BELTING COMPANY, MANHEIM, PA.

A WHOLE NEW CONCEPT OF INSTRUMENTATION BASED ON BROWN CONTROL TECHNOLOGY IS REVOLUTIONIZING THE FOOD INDUSTRY FROM COAST TO COAST!

inside info pays off



Into sausage, hanging on tree in smokehouse at Weiland Packing Co., goes special thermocouple that plays key role in improving quality and reducing smoking time.

Multi-Point ***ElectroniK*** *recorder, centrally located near sausage room, shows internal temperatures of meats in 12 different smokehouses.*

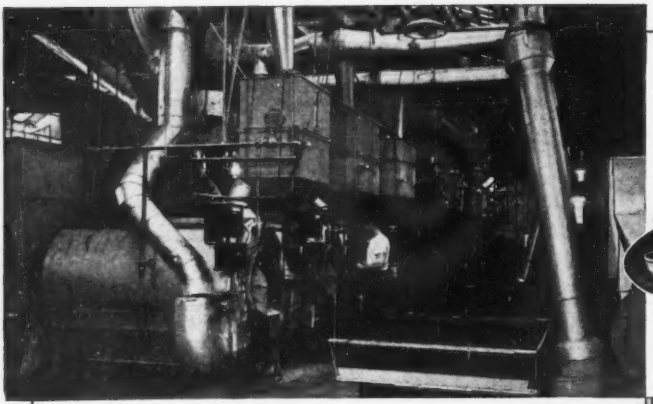
PACKERS are cutting smoking time by as much as 15% . . . by getting inside information on meat temperatures during the smoking cycle. The pay-off lies in increased production *plus* a higher quality product.

A Brown Meat Thermocouple . . . so tiny that it can be inserted without splitting casings or scarring meats . . . teams up with an *ElectroniK* recorder to measure and record the facts as quick as a wink.

Such a unique temperature measurement is but one of many Honeywell advancements to keep modern instrumentation paced to the needs of food processing techniques. The list also includes the measurement and control of flow, pressure, liquid level, density, conductivity, humidity and other important variables. Your local Honeywell engineer is qualified to help you with production and control problems of both a quantity and quality nature . . . to get the best from your equipment, materials and manpower.

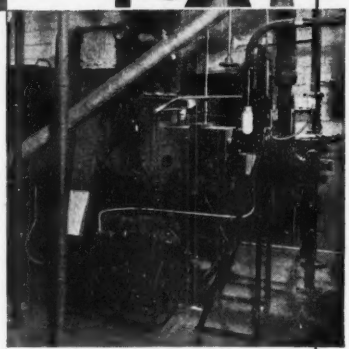
For detailed information in internal temperature measurement in Meat Packing, write to Station 40, MINNEAPOLIS-HONEYWELL REGULATOR CO., *Industrial Division*, 4502 Wayne Ave., Philadelphia 44, Pa.

MINNEAPOLIS
Honeywell
Brown Instruments



Battery of 9 batch Gas-fired coffee roasters. Gas burners fire vertically in combustion chamber, visible at extreme left.

Woolson official "cup tests" various coffee brands.



Gas burner equipment and controls at charging end of new Jabez Burns continuous roaster.

For Uniform Coffee Roasting

Woolson Spice Company

relies on GAS exclusively

FAST, UNIFORM ROASTING is essential to private brand coffees processing and packaging at Woolson Spice Company. This Toledo, Ohio, food manufacturer uses GAS in processing more than 10 tons of coffee per hour, and has been coffee-roasting with GAS exclusively for more than 25 years.

The original Jabez Burns coffee roasters employed a direct Gas-firing principle. These units were later modernized with Gas-fired air heaters with automatic controls, and the capacity of each roaster was increased 50%. The battery of 9 roasters has an output capacity of 25,000,000 pounds annually.

Increasing national per capita demand, now almost 19 pounds per year, recently required another expansion at Woolson Spice Company. Accordingly, a modern Gas-fired Jabez Burns continuous convection roaster was installed, bringing total annual production to 33,000,000 pounds.

For coffee roasting, or any other type of food processing, GAS has many advantages over other available fuels. The Woolson management expresses it this way: **"GAS is the only fuel which will roast our product economically, uniformly, and at the same time bring to each of our many blends the ultimate in consumer satisfaction."**

Your Gas Company Representative will help you take advantage of the modern methods of heat processing with GAS.

AMERICAN GAS ASSOCIATION

420 LEXINGTON AVE., NEW YORK 17, N.Y.

MORE AND MORE... THE TREND IS TO GAS FOR ALL HEAT PROCESSING OF FOOD

Magnify food flavor and you Multiply food sales!

ZEST—the amazing Seasoning that Intensifies and "Locks In" Processed Food Flavors

It's fresh food flavor that moves canned goods off grocers shelves . . . make no mistake about that! Today there is a way to make certain *your* processed foods have the taste appeal, the flavor appeal that *sells*. Canned, frozen or dehydrated foods—all get a *new flavor lift* with the addition of ZEST Monosodium Glutamate. These amazing wonder working instantly soluble crystals of pure vegetable protein magnify . . . intensify the fresh food flavor so often lost in processing.

ZEST adds no flavor, color or aroma of its own . . . it simply enhances the true natural food flavors already present. As little as 0.05% by weight works flavor magic in canned vegetables, soups, poultry, meats and scores of other foods. ZEST requires no changes in your present formulas . . . and it is as easy to use as salt!

Test your own processed foods seasoned with ZEST. You can taste the difference instantly. Better yet, your sales will show that your customers appreciate more flavor, too!

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Staley's MONOSODIUM GLUTAMATE

A. E. STALEY MFG. CO., DECATUR, ILLINOIS

Stocks carried in all principal cities

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A. E. Staley Mfg. Co.
Dept. FE-10, Decatur, Ill.

Gentlemen: Send me more information about Zest, Staley's new unique seasoning.

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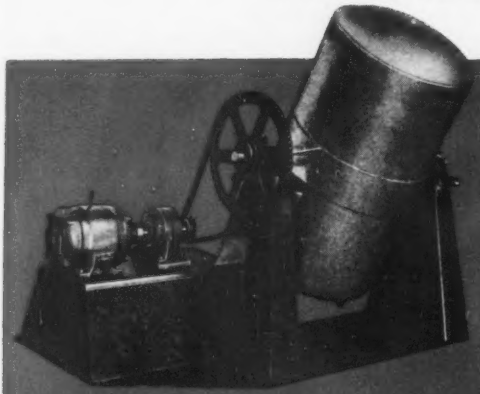
BACK IN THE 1880's

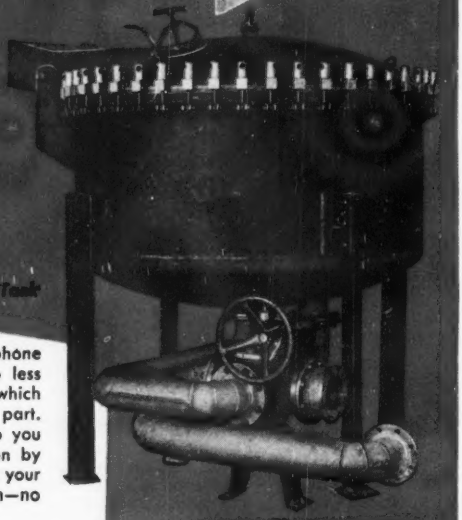
WHEN THE FIRST NEW YORK TO CHICAGO TELEPHONE COMMUNICATION WAS OPENED

Koven

WAS MAKING INDIVIDUALIZED FOOD EQUIPMENT



30" x 48" Tumbling Barrel—Galvanized



Stainless Steel Dye Tank

Conversation over the first New York to Chicago telephone seemed like a miracle back in the 80's. And no less amazing was the evolution of food manufacturing in which KOVEN Individualized Food Equipment was taking part. Today, as then, KOVEN skilled engineers can help you profit from more economical and efficient operation by fabricating food equipment individually designed for your specific needs. Call or write today for a consultation—no obligation.

Our complete facilities include: machine, sheet and plate, welding and galvanizing shops, X-ray equipment and stress-relieving furnace. Among the many KOVEN products in all commercial and non-corrosive metals: Stainless Steel; Aluminum Sheet Fabrication; Boxes, Tote, Waste Cans; Chemical Apparatus; Coils and Pipe Bands; Copper Sheet Fabrication; Galvanizing Work; Mixers, All Kinds; Monel Metal Fabricators; Pails, Special Heavy; Pans, All Types, All Metals; Sinks, Scullery and Factory; Tables, Galvanized or Monel; Tanks, All Types, All Metals; Kettles, All Types, All Metals. Fabrication to A.S.M.E. Code Par. U-68 and U-69 a specialty.

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154 Ogden Ave., Jersey City 7, N. J.

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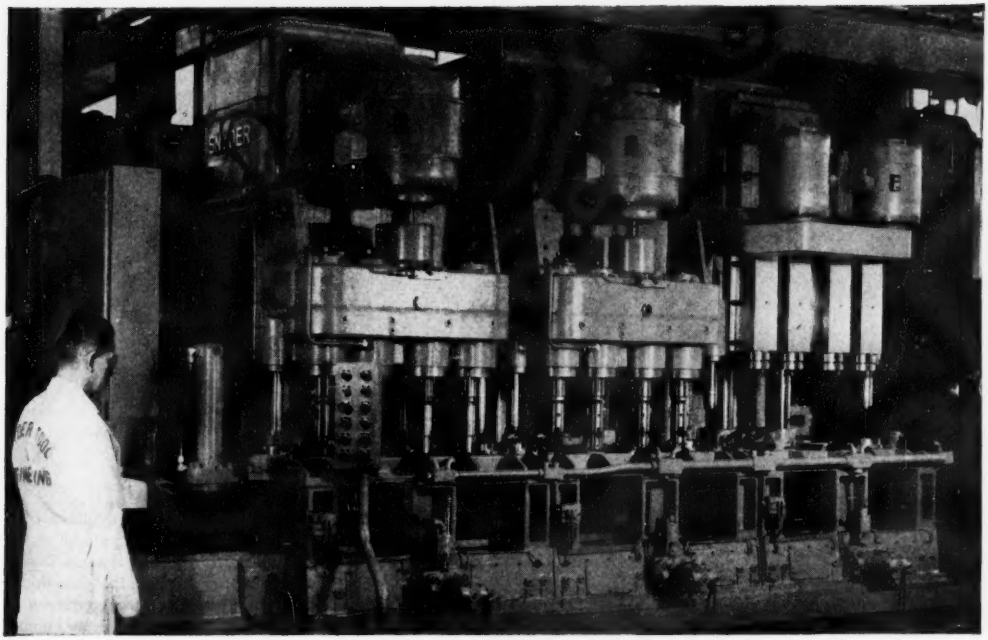
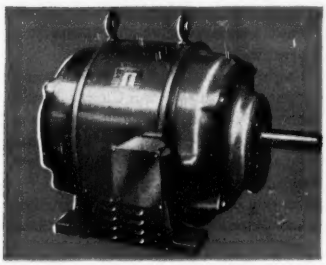
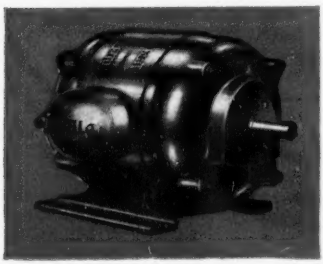


Three jobs done, instead of one!



Howell Type **F** Motor. A high slip, high torque motor designed for punching and boring operations. Sizes ½ to 200 H.P. in open frames; ½ to 125 H.P. in enclosed frames.



Howell Type SC, general purpose, protected-type Motor. Ideal for driving machines and equipment where atmosphere is moisture- or dust-free. Horizontal or vertical mounting.

This 7 station transfer-type boring machine was designed and built to replace *three* machines!

It rough bores, semi-finish bores and finish bores cylinder sleeves to exacting tolerances in one continuous, automatic operation.

Howell engineers worked closely with this manufacturer to provide the right type and size motor for each application. Two 15 H.P. and two 5 H.P. Howell Industrial Motors supply dependable power for the twelve boring spindles. A 7½ H.P. Howell motor operates each of the three hydraulic pumps which control the rough, semi-finish and finish heads. Each motor was engineered for its job!

This is a typical example of the service Howell offers you. We will work with you, both in your plant and at Howell, to design precision-built, quality motors for your jobs.

Our research facilities, engineering experience and manufacturing skill are at your service. May we help you?

HOWELL ELECTRIC MOTORS COMPANY
Howell, Michigan

HOWELL Red Band MOTORS

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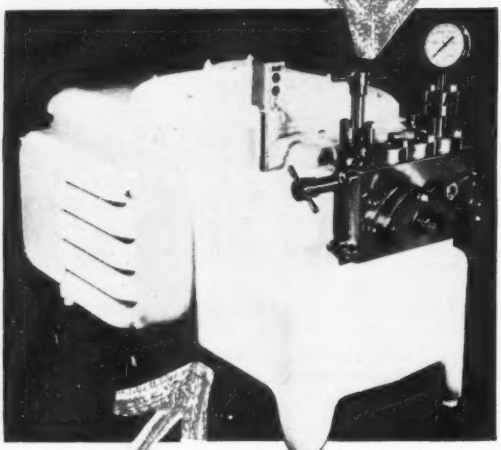
HOWELL ELECTRIC MOTORS CO., HOWELL, MICH.

Precision built industrial motors since 1915

WHY SETTLE FOR LESS THAN Superhomo

INDUSTRY'S MOST ADVANCED HOMOGENIZER

Superhomo—industry's finest homogenizer. Available in capacities from 50 to 2500 g.p.h. Improved design permits easy capacity increase at low cost.



If your production today is geared to an old-fashioned or inefficient homogenizer, the records may well show a waste of valuable man-hours in all departments. Every machine, every process in the plant will feel the effects of forced slowdowns, perhaps even work stoppages. It might also require overtime to process the daily quotas and more overtime for cleanup.

If this is the case in your plant, you should start planning today to replace your present homogenizer with a Superhomo and eliminate these threats to profit.

Superhomo can assure a smoother flow of product at the production rate your plant and your profits demand. It can set the pace for a plant-wide, high production rate that eliminates product loss, expensive shutdowns, loss of production and overtime during busy seasons.

Today, when the right methods and equipment count so much, it is important that you see your Cherry-Burrell Representative about a Superhomo with the right capacity for your plant. Act now while you can get *prompt delivery* so that future material shortages cannot affect your production and profit.

Use the coupon to get Bulletin G-463 that describes the many Superhomo patented and exclusive features.

Superior Homogenization
—simple, efficient homogenizing valve, single or two-stage operation. Replaceable stainless steel valve caps absorb 98% of the wear and provide improved performance at lower pressures.

Sanitary, Sturdy Cylinder Block
—solid stainless steel for greater strength and sanitation. All parts are easily removed from *front* of block for cleaning in 1/3 normal time.

"Extra Life" Plunger Vee Seals
—records prove that these neoprene seals can give as much as 1000 hrs. service at peak capacity. In addition, they mean greater sanitation, efficiency and economy.

Rugged, Compact Frame and Drive
—mechanism is designed to give many years of trouble-free operation. Timken roller bearings reduce friction and wear. Lubrication is positive and automatic.

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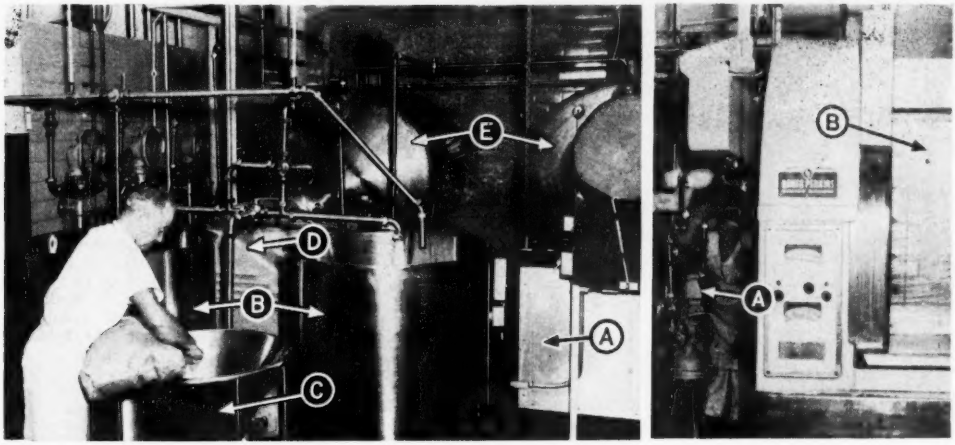


CLOSEUPS tell story. Left photo: Shortening is melted in vat (A), next metered into pre-mix tanks (B), along with water. Salt and sugar are then dumped into hopper (C) that feeds them into pipe recirculating water-fat emulsion. Condensed milk is now added, and all ingredients pass through homogenizer (D) before going to storage tanks (E). Right photo: Finally, meter (A) is preset to deliver measured amount of homogenized mix into dough mixer (B).

New Homogenizing Twist Banishes Weighing Chores

Method, accidentally discovered by Massachusett's bakery speeds salt, sugar, milk, and shortening into pre-mixers without batch scaling. Emulsion is then directly metered into the dough mixer

EINER L. ANDERSON and JAMES F. MULLEN
Manager of Bakeries and Superintendent of Bread Bakery, respectively, First National Stores, Inc., Somerville, Mass.

At First National Stores, Inc., we've been able to dispense with the batch-weighing of salt, sugar, milk, and shortening in the preparation of our white doughs—and yet produce more uniform quality bread.

We credit this to a recent development in our Somerville, Mass., bakery —a dry ingredient-handling system that involves dumping materials (pre-weighed by suppliers) into pre-mix tanks, emulsifying the mix with a homogenizer, and then metering the blend directly into the dough mixers.

Aside from doing away with the tedious batch-weighing this ingredient-handling technic also eliminates:

A. Scaling errors by the ingredient men.

B. Need for cleaning receptacles into which the dry ingredients were weighed.

C. Loose control over our inventory.

D. Loss of ingredients that formerly adhered to the scaling buckets.

There are other benefits to our new system:

Except for the two premix tanks, the entire system is closed. Employed are sanitary stainless steel pipes, valves, and fittings that readily disassemble each day for cleaning. Pipes are cleansed with a motor-driven brush —the type used in dairies.

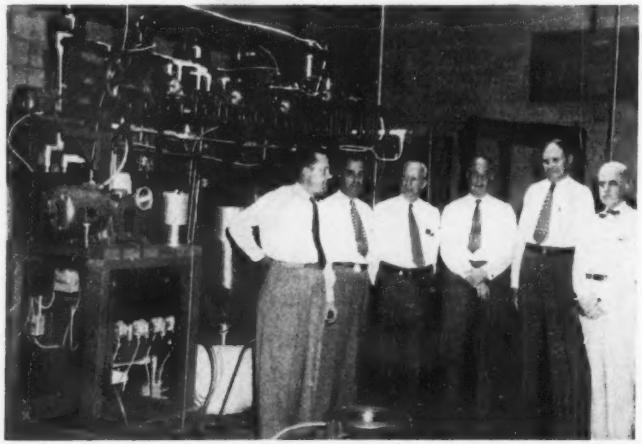
Now only one ingredient man is needed. The other two men have been transferred to the company's mixing department.

An average 100-percent white bread formula calls for 700 lb. of flour, together with 4-6 percent milk, 4-8 percent sugar, 2 percent salt, and 4 percent shortening. Formerly, each ingredient except the flour had to be weighed to make up the formula. In the case of salt, we had to weigh 14 lb. for each batch. We always had to do this seven times before opening up another 100 lb. bag. The same was true with the other ingredients.

Now, we have designed our pre-mix tanks so they can handle salt, sugar, and dried milk by 100-lb. bags and also sweetened condensed milk by the

(*Turn to page* 185)

Group Sees Concentrator Demonstrated



DEMONSTRATION of 'StepFreeze' concentrator (left) was given on August 14 in Dayton laboratories of Commonwealth Engineering Co. On hand to see orange juice processed were (left to right): Malvern J. Hiler, president of Commonwealth; J. M. Lambert, manager of consumer sales, York Corp.; E. P. Wenzelberger, Commonwealth's director of chemical engineering; Arthur E. McElfresh, New York sales and management consultant; H. E. Dierker, treasurer of Patterson Foundry & Machine Co.; and Harry A. Toulmin, Jr., of Toulmin & Toulmin, owner of Commonwealth. The author was behind the camera.

Water Frozen Out

WATER IS REMOVED from juice in form of small clear crystals, a batch of which is shown removed from receiving tank for benefit of cameraman.

Engineering Advances FREEZE-Concentration

"StepFreeze" process improved by new freeze-tanks that form small, clear ice crystals to reduce solids loss. Centrifuge removes ice in automatic operation

FRANK K. LAWLER
Editor, "Food Engineering"

Concentration by freezing has been brought to a new stage of development. A new principle has been harnessed through advanced engineering to overcome a previous disadvantage and to retain the advantages.

Freeze concentration has intrigued food technologists and processors for at least a quarter of a century. Many have experimented with it. A few have applied it in a limited way. Most have abandoned it as a process which looks good on paper but not so good in practice.

It always has appealed to processors for two principal reasons: First, it takes less energy to remove water by freezing than it does to take it out by evaporation. Even the high school student knows that you have to remove only 143.4 Btu. to convert 1 lb. of water to ice, while 971.7 Btu. must be added to convert the same amount of liquid H_2O to a vapor.

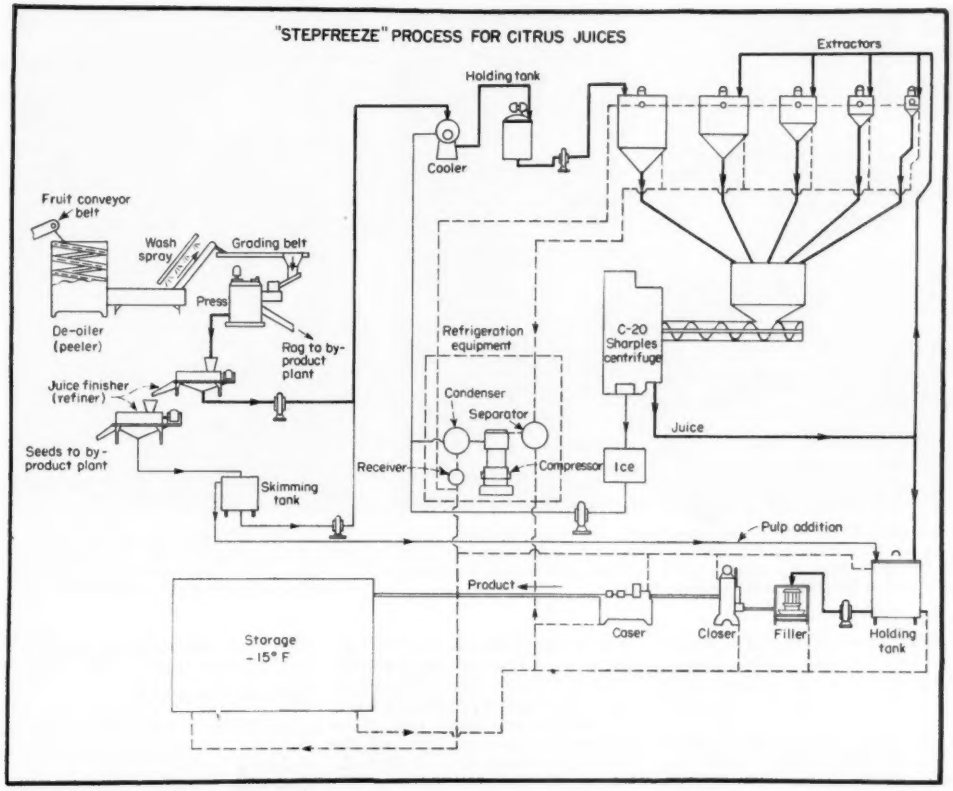
Second, freezing does no damage to the flavor of heat-sensitive foods, while evaporation often does. Even in a high-vacuum low-temperature evaporator, some of the flavor escapes with the vapor. That is why concentrated orange juice never rang the taste bell until single-strength juice was added to put back the zing.

But freeze-concentration hasn't panned out so well in the past because too much of the soluble solids in the product was entrained and lost in the ice. This meant throwing away more valuable raw material than the processor could afford and still meet competitive prices.

And that is just where the new "Step-Freeze" process of Commonwealth Engineering Co., Dayton, Ohio, garners its main advantage over previous methods of concentrating by freezing. Now ready for commercial-scale application, it handles the freezing and the separation of the ice in such a way as to reduce solids loss to a lower level. Experimental work in concentrating milk shows the loss in the production of a 36 percent solids product to be 0.56 percent. For orange juice, losses of sugar in the ice should not exceed 0.75 percent in the first three stages and 1 percent in the last two stages of the five-step freeze-concentration operation which reduces the juice to 61 deg. Brix. It takes only four stages to produce 42 deg. Brix orange juice. And Commonwealth reports final-product yields equivalent to 95 percent of the amount of orange juice in the fruit.

As with most new developments, it took a lot of patience, perseverance and ingenuity to bring the StepFreeze process to its present status. Starting with the basic idea of removing the water by a series of freezing steps at progressively lower temperatures, Com-

How Complete Citrus Juice Process Operates



FLOWSHEET of complete "StepFreeze" citrus juice extracting and concentrating process. The freeze-concentration part of the process has been pilot-tested successfully for other fruit and berry juices, milk, vinegar and beer.

monwealth Engineering devised, built and experimented with various systems. The first to be announced was a series of four caseaded refrigerated troughs with sereens to move the ice crystals counterflow from one trough to the next (see *Food Industries*, Oct. '48, pp. 82-83). Then a series of refrigerated tanks was tried, with different arrangements for forming and removing the ice. Finally, Commonwealth ingenuity arrived at the present system, which is a good example of food engineering.

Essentially, the perfected StepFreeze system consists of as many as five insulated freezing tanks which convert the water to ice crystals, plus a centrifuge to remove the ice from the remaining liquid. The liquid from tank 1, after centrifuging, goes to tank 2, then tank 3 and so on until it reaches the final density. Hence the name, StepFreeze. Centrifuging, of course, is a necessary operation between each freezing step.

The freezing, or heat-transfer, element in each tank consists of three vertical stainless steel cylinders through which is pumped glycol refrigerated to minus 10-20 deg. F. This glycol is chilled in an outside heat exchanger by ammonia from York refrigerating compressors, and it is pumped through pipes to the freeze cylinders and back to the heat exchanger in a closed system.

Use of glycol avoids the need for high-pressure freeze cylinders and fittings, greatly simplifying engineering design and lowering construction cost. It also puts the ammonia at a safe distance from the product and the processing area.

To avoid formation of ice on the cylinders, and increase rate of heat transfer, a three-bladed "scraper" rotates at 125 rpm. around each cylinder. The blades, which extend lengthwise of the cylinder, are made not of metal, but of nylon—one of those important little things developed by trial and error. While the blades rub lightly against the cylinder walls, their function is not to remove ice but to prevent its forming on the cylinder in the first place. It is essential that the ice form as small clear crystals in the fluid, not as white ice which entraps solids.

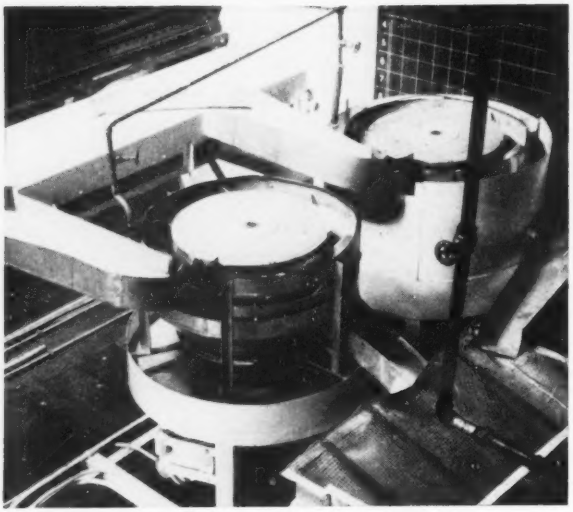
But the main job of agitating the juice is done by a small propeller near the bottom of each tank below the freezing cylinders. This propeller turns at 800 or 900 rpm. Like the nylon scrapers, it is driven by a shaft extending through the top of the freeze tank.

Here's How It Works

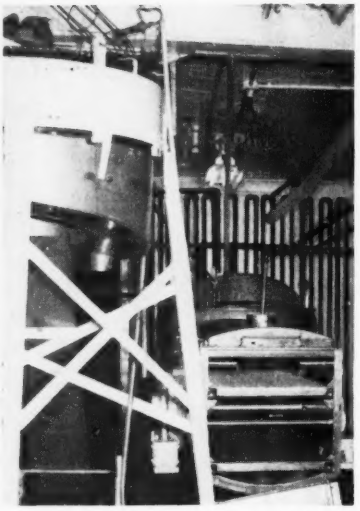
Let us see how the 250,000-gal. process operates with orange juice.

After precooling to 34 deg. F., the juice feeds into freeze tank 1 until, at the proper level, a float closes the valve and stops the pump. Then the refrigerated cylinders drop the temperature of the product to 22 deg. F. in 20 min. to freeze out roughly one-

These Machines Peel, Deoil and Screen Juice



TWO PEELER-DEOILERS of new design. Metal fingers carry each fruit between rotating cylinders covered with detachable abrasive canvas to remove peel, and oil, down to white albedo. Peeled fruit is conveyed under water spray to juice extractor.



JUICE EXTRACTOR, also of new design (at left), and vibrating-screen classifier which separates seeds, pulp and rag from juice. Pulp is later added to concentrate.

third of the water. In each subsequent step about one-third of the water in the juice entering the tank is removed by a 5-deg. temperature drop in 20 min.

The 20-min. freeze period is determined by fixing the refrigerated surface area in relation to the volume of liquid in the tank. In tank 1, which is 41 in. deep to the top edge of the gently sloping bottom, and of 35 in. diameter, the three refrigerated cylinders are each 41 in. long and of 14 in. outside diameter. Temperature of the glycol entering the cylinders in each stage is the same, but temperature in each tank is controlled.

With this control over freezing, with the juice agitated, and with scraper blades moving around the cylinders, small clear ice crystals form, and float in, the juice—the secret of success of the process. Also with this freezing setup, a high rate of heat transfer is attained.

At the end of 20 min., the ice-juice slush has reached the point where no more freezing occurs at the temperature in the tank. Then the process timer operates a pneumatic power unit to quickly open the 8- or 10-in. diameter sanitary flap valve at the bottom of the feeze tank and dump the entire contents into a closed cylindrical chute and thence into a tank serving all five freezing units. From this tank the slush is screw conveyed to a C-20 self-unloading Sharples centrifuge to separate the ice crystals from the juice. To insure complete juice removal, the ice is rinsed in the centrifuge with water at 34-36 deg. F.

Controlled by a timer so that it can handle the discharge from all five tanks in sequence, the centrifuge discharges the ice into a receiver. After slushing with 34-deg. water, the ice is pumped to a juice precooler and to the ammonia condenser to recover its refrigeration value. About 20 percent of the total refrigeration load is recovered and reused in the form of ice.

The juice from the centrifuge, concentrated from 12 to 18 deg. Brix in the first freezing tank, is pumped into tank 2. Then the freeze and centrifuge operations are continued until a juice of 45-48 deg. Brix discharges from tank 4, or of 58-61 deg. Brix from tank 5. Collected in a refrigerated holding tank, the concentrate is adjusted to the precise Brix by adding a little single-strength juice. Then it is put into cans, by a positive-displacement filler, and the cans are closed, and conveyed into a —15-deg. F. room for freezing and storage. Being close to zero deg. F. when it leaves the concentrator, the juice requires no further refrigeration before going into the freezing room.

When citrus juice is being processed, the previously removed pulp is put back into the juice in the holding tank —or at least as much pulp as consumer preference dictates.

It takes about 1 hr. to convert raw fruit to concentrate by this process.

More About Various Stages

In giving the overall picture of the concentrating process, we skipped lightly over stages 2 to 5. Let's see just what happens in these stages.

Again, referring to orange juice, freeze tank 2 takes the 50 gal. of 18-deg. Brix discharged from tank 1. It lowers the temperature from 22 deg. F. to 17 and discharges the slush at 27-28-deg. Brix to the centrifuge. Tank 3 receives 34 gal. of concentrate and reduces it to 24 gal. of 36-38-deg. Brix juice at 12 deg. F. This goes through stage 4 and comes out as 16 gal. at 45-48-deg. Brix. at 7 deg. F. finally, stage 5 yields 12 gal. of concentrate at 58-61-deg. Brix at 2 deg. F.

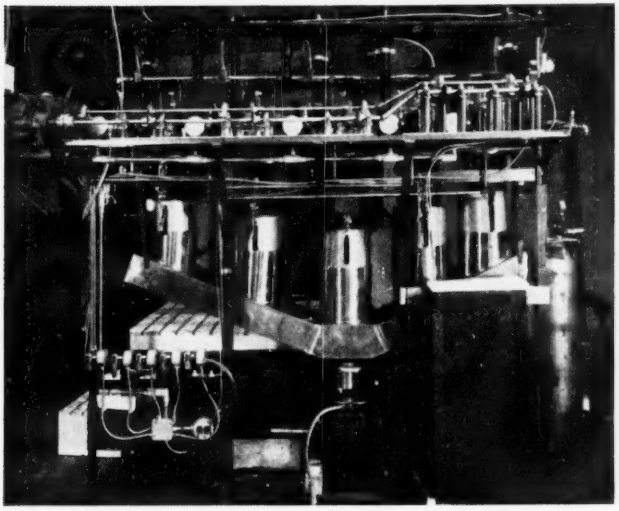
Freeze tanks and refrigerated cylinders are progressively smaller, of course, for the 5 steps. Tanks 2, 3, 4 and 5 are, respectively, 33, 27, 18 and 15 in. deep. Tank 2 is of 30 in. diameter, and the following three tanks 22 in.

Lengths of the refrigerated cylinders in tanks 2, 3, 4 and 5 are respectively, 30¼, 27, 18 and 15 in., and their diameters are 12 in. for tank 2 and 8 in. for the other three tanks.

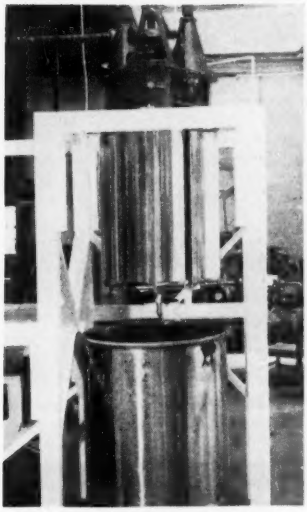
Operation Continuous

Equipped with automatic controls to open and close valves at proper

These Freeze the Water Out of Juice in Steps



CONCENTRATOR in pilot plant. Five freeze tanks in series reduce orange juice to 61 deg. Brix. Four bring it to 45 Brix. There are three refrigerated cylinders in each tank, and ice is formed as small clear crystals in juice. The slush then is centrifuged to separate ice and juice.



CLOSEUP of freezing cylinders removed from tank. Nylon scrapers prevent formation of ice on metal. Propeller agitates juice.

time intervals, the process is a continuous batch system. It turns out three batches of concentrate an hour without any manual operation once the process commences. One attendant watches the operation to make certain that the robots keep it ticking along, but this operator has time to do other things in the area of the unit.

All of the automatic valves are actuated electrically, with air supplying the operating power for the heavier jobs, such as opening and closing freezing-tank discharge valves.

Power Demand Small

It takes relatively little energy to operate the process. In the 250,000-gal. (of concentrate) Step-Freeze plant in Florida, approximately 15 tons of refrigeration is used for freeze-concentration and to hold the cold room at zero. The compressor is driven by a 20-hp. motor. For the largest freezer tank, ¾ hp. is needed to drive the agitator and scraper. The centrifuge is equipped with a 5-hp. motor. And some additional horsepower is required for the peeling and juicing machines, as will be mentioned later.

System Quite Flexible

One of the advantages of Step-Freeze is flexibility in degree of concentration. Any number of the five stages may be used, depending upon degree of concentration wanted. Then the system is planned for multiple-unit operation. Thus a million-gallon-per-season plant would have four StepFreeze systems. And this would permit operators to handle fruits of different types and sugar-acid ratios separately for convenient blending, or for storage and later blending.

It is even contemplated by Commonwealth that Step Freeze juice may be transported by tank truck to central blending and packing plants.

Applicable to Various Foods

The freeze-concentration unit is basically the same, whatever the product handled. Though, of course, each product calls for a design tailored in respect to such factors as freezing-surface area.

Tests by Commonwealth indicate effective performance in the concentration of citrus, apple, grape, pineapple and raspberry juices, milk, vinegar and—of all things—beer. The interest in concentrating beer stems from the idea of producing a non-carbonated beer concentrate in a central plant and shipping this to bottling plants around the country to cut freight costs. The procedure would be much the same as that in the carbonated beverage industry.

Extensive laboratory work and pilot plant operations have been conducted on milk, with an eye on the production of 36 percent solids concentrate prior to spray drying.

Many laboratory-scale and pilot-plant runs have been made on vinegar and apple juice. The purpose for concentrating vinegar is to reduce shipping costs.

Grape, pineapple and raspberry juices seem suited to freeze concentration. Preserving the delicate ester flavors is of paramount importance with these products.

Raspberry juice, Commonwealth reports, concentrates to a heavy heady syrup of 56 deg. Brix. And grape juice comes down to a rich syrup at 43.5 deg., with simultaneous precipitation of tartrates. There is pay-off in the latter phenomenon since it eliminates refrigerated storage for tartrate removal.

Applications also are foreseen in the chemical and pharmaceutical industries. Commonwealth believes that the separation of materials from organic solutions offers a big field for freeze-concentration.

Additional Advantages

Aside from flavor protection and flexibility, the StepFreeze procedure offers the advantages of relatively low cost, small-size units, not too much floor space or building height, and, therefore, easy adaptability to existing buildings. Its design also points to easy cleaning and maintenance and low operating expense.

For the citrus juice industry, Com-

(*Turn to page* 210)

PROCESSING—The noodles must be measured to assure uniformity.

PACKAGING—Operators place each noodle carton on moving sleeve.

MAINTENANCE—Here, worker sharpens noodle-cutting blade.

The Better They *See*

Employees' visual tasks can be evaluated, engineered and eased—thereby boosting all plant performance, quality-wise, dollar-wise, and health-wise

VICTOR A. LENNON

Director, Department of Occupational Vision, Associated Business Consultants, Chicago

Management is realizing more and more that it must give top priority to the all-important, and yet comparatively new, science of human engineering.

The values to be gained are increasingly evidenced by the experience of such foresighted food companies as the I. J. Grass Noodle Co. of Chicago—which has achieved dramatic results by giving attention to just one phase of human engineering, *visual performance*.

Benefits to this processor through installation of an occupational vision program have included:

- **Production increases estimated conservatively at 10 percent per annum**
- **Improved product quality as a result of more thorough inspections**
- **Significant reduction in labor turnover and better employee relations**
- **Annual savings of $5,000 through reduction in over-weight packages**

Upon reviewing some of the human factors that affect job performance—mental ability, manual dexterity, overall coordination, and vision—the latter stands out in particular. For vision has been ascertained to control 80 percent of the activities of the individual on the job, thus emphasizing the importance of improving this skill.

Most people associate the importance of visual performance with such detail operations as watch manufacture and radio assembly. But how vital can it be in a food plant? Perhaps the processor tends to dismiss it with, "There are no fine details that my employees have to see."

Vision in Food Processing

But let us analyze more carefully the role of vision in food processing. Studies at I. J. Grass revealed:

1. *Manufacturing Department*—The visual requirements include reading orders and formulas, inspecting dough, using a micrometer on noodles and weighing—all of which involve the discrimination of moderately fine detail. Adequate near and far vision are obvious requisites for the successful performance of this kind of work.

2. *Packaging Department*—Here it was found that accurate reading of the scale indicator dial requires a degree of "critical seeing", as does the operation of inspecting cellophane bags for proper imprint, alignment and sealing.

3. *Shipping Department*—Visual requisites of this operation include reading orders and scanning labels on stacked cartons. Also, colors of red, blue and yellow have to be differentiated. A degree of near and far vision and color vision is required for successful performance in this department.

4. *Maintenance Department*—Operations here include the visual requirements of discriminating between fine detail and poor contrast at varying distances. Critical "near" vision is definitely needed for successful performance of maintenance tasks.

5. *Administrative Department*—Personnel in this department perform operations having visual requirements ranging from "difficult" seeing tasks involving fine detail to "ordinary" seeing tasks involving discrimination of moderately fine detail. These tasks include reading, handwriting, penciled stenographic notes, and duplicated material; bookkeeping; tabulating and accounting.

Figures Don't Lie

Perhaps you, as a processor, are still unconvinced that vision is of major importance in such seemingly routine operations. Well, figures don't lie—so let's review some of the statistics gathered.

In our studies we ran a correlation between "near visual acuity" and the job performance ratings of personnel—as rated by their supervisors. Operators were classified as best, average and poor. Here's how they rated on the near-vision test:

50 percent of the best operators passed

25 percent of the average operators passed

0 percent (not one) of the poor operators passed.

The Better the Product

We also ran a study concerning the relationship of "eye muscle balance" and performance ratings of these same food operators. The following had normal eye muscle balance:

85 percent of the high-rated employees

70 percent of the average employees

45 percent of low-rated personnel.

Stated another way, all of the operators who passed the test of near vision were rated high or average by their supervisors, whereas none of the operators rated low by their supervisors were able to pass the test of near visual acuity. And of all the employees displaying proper eye muscle balance, 78 percent were rated high or average by their supervisors—with only a remaining 22 percent being rated below average.

A third study involving depth perception showed that none of the operators who failed this test was rated high; whereas 66 percent of those failing were classified as poor performers by their supervisors.

Cite Savings With Better Sight

What does all this mean to management?

Results at I. J. Grass tell the story. The company has already experienced considerable savings through interpretation of these findings and an intelligent program of improvement.

Savings have accrued through a reduction in the number of overweight packages leaving the plant. Savings have also appeared through increased production—operators can now see more accurately, rapidly and, above all, more comfortably. Savings have resulted through a marked reduction in labor turnover—an average cost factor of $100 per person. This has been accomplished both by spotting those applicants who would be visually incapable of performing a job, and by providing present employees with more comfortable vision.

Four-Fold Program

The next question: How can industry set up such a program?

A description of the occupational vision program which has been in effect at I. J. Grass will indicate a successful method. Essentially, the program is divided into four phases, as follows—

1. Evaluation of the visual abilities of present employees.

2. Determination of the many visual requirements of jobs.

3. Engineering of visual standards for the job.

4. Aid in the correction of poor vision.

The Keystone Telebinocular is used to check visual abilities. It is an industrial instrument which can provide a rapid and accurate means of evaluating visual skills. Eleven distinct eye skills—both distant and near—are measured (only taking about 5 min. per employee). A full picture of employee sight capabilities is thus provided.

A visual analysis is conducted on each type of job in the plant, with results indicating distance at which employee is required to see, type of seeing he is required to do, height at which he is required to see, and the conditions under which he is required to see.

A case history will show how important this is. A study recently conducted in a printing plant revealed that the operator of a cutting machine was 62 in. tall. To set his machine, he had to read a dial located 67 in. from the floor and approximately 12 in. in front of him.

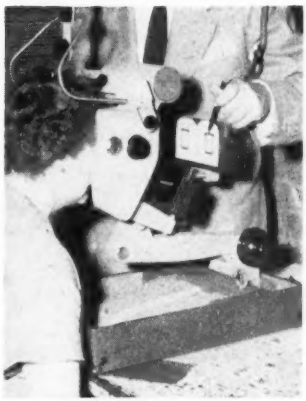
It so happened that the man was in the "bifocal stage," which required a considerable amount of neck calisthenics for him to see the dial clearly. He was forced to tilt his head back in order to look *up* through the *bottom* part of his bifocals.

If the specialist who prescribed the glasses had been aware of the job requirements, it would have been a simple matter to provide lenses having a small reading section at their top. With these the operator would only have to raise his eyes—sparing him arduous and continuous head and neck movement.

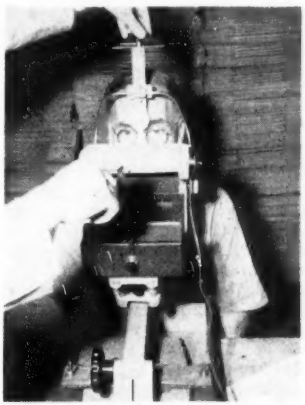
Brighten Things Up

At the same time that visual requirements are analyzed and recorded, the seeing conditions are also checked for each job. The importance of proper quality and quantity of illumination cannot be over-emphasized. It pays real dividends in terms of decreased employee fatigue, which of course results in increased output and reduced employee irritability.

Merely pouring a lot of light on a work area or hanging a light fixture directly over a work point does not begin to solve a lighting problem properly. A correctly engineered lighting plan always proves to be more



CLOSE FOCUS—Telebinocular is used to gage worker's acuity.



SIDE VISION—Should be good if employee is on moving line.

VIEWING RANGE—Work distance of sealing job is checked.

economical in the long run, in addition to enabling a better job.

By studying the relationship of visual abilities to job requirements, standards on the degree and type of vision most desirable for a particular job can be established.

In setting up visual standards for a job it must be remembered that there is no correlation between distance and near vision. Even today, many plants employ the fallacious procedure of giving a 20-ft. "wall-chart" test and then placing the applicant on a job which requires good vision within a 16-in. distance.

The value of such study—especially in a tight labor market—is many-fold. For example, we found that 20/20 vision was not an absolute necessity in the packaging department. Thus, an employee with 20/30 vision could be selected for this work and would perform as well as an operator with much keener vision.

Also, as a result of establishing visual standards for each job at I. J. Grass, older employees, whose vision could not be brought up to normal clinical standards, are being used to best advantage.

Aids Personnel Dept.

This helped to solve a very sensitive labor relations problem in which several employees of long service records with the company were no longer performing adequately on the job that they were doing. After learning that impaired vision was a major contributing factor to their decreased production, management was able to place them on jobs where vision was not as great a factor and for which they were qualified.

After establishing visual standards and evaluating the skills of present

NOWHERE is proper vision more vital than at inspection posts.

employees, it is a simple matter to pick out those workers with inadequate vision for the job they are performing. These are personally interviewed and their visual scores reviewed. The personal benefits that will be gained by each individual, if his vision is corrected, are pointed out.

As a result of the study, all those employees, except one, with defective vision visited an optometrist or ophthalmologist of their own choice and had their vision diagnosed and corrected.

Summary Helps

After carrying out the above four points, comprising an occupational vision program, and before any of the results mentioned above could naturally have come about—a written report of the findings and recommendations was submitted to management. Essentially, this report detailed:

1. Lists of those employees not having proper vision.
2. The visual standards for each job in the plant.
3. Recommendations for improving job-seeing conditions.
4. Recommendations for proper use of color, including a safety color code to retard accidents and encourage good housekeeping.
5. A completed "referral form" for each plant job, with job descriptions indicating visual requirements.

The proper form is given to the employee who, in turn, takes it to the eye specialist of his own choice. The information contained is invaluable in enabling the doctor to provide the employee with the type of vision he needs to accomplish his job more effectively and with a minimum of eye fatigue.

Spot Results Quickly

After installing a vision program, production increases and quality improvements follow rapidly. For one-third of the total energy expended daily by a worker involves the act of seeing. When seeing is made easier and almost effortless, body fatigue decreases and efficiency goes up. This, of course, leads to happier employees in terms of increased job satisfaction and improvement in temperament.

If, at the end of a workday, the employee can leave his station without being completely depleted of energy, he will enjoy his after-work hours much more. And the next morning he will return to his job more relaxed and in better mental and physical condition.

One of biggest differences between profit and loss today lies in effective utilization of available manpower. Occupational vision provides the means for improving human performance. Use of it will place you in a more desirable competitive position.

New Performance Through Human Engineering

In its constant grappling with the four "M's" of business —machinery, materials, money, and manpower—our plant managements of the past often fell far short of achieving optimum values with the last named—manpower.

The great accent was on those first three "M's." Yet despite the tremendous strides in mechanization that this approach achieved, the human element has always remained the key. And today, with comparable equipment and processes available to all, the effective use of people stands as a prime factor upon which competitors either rise or fall.

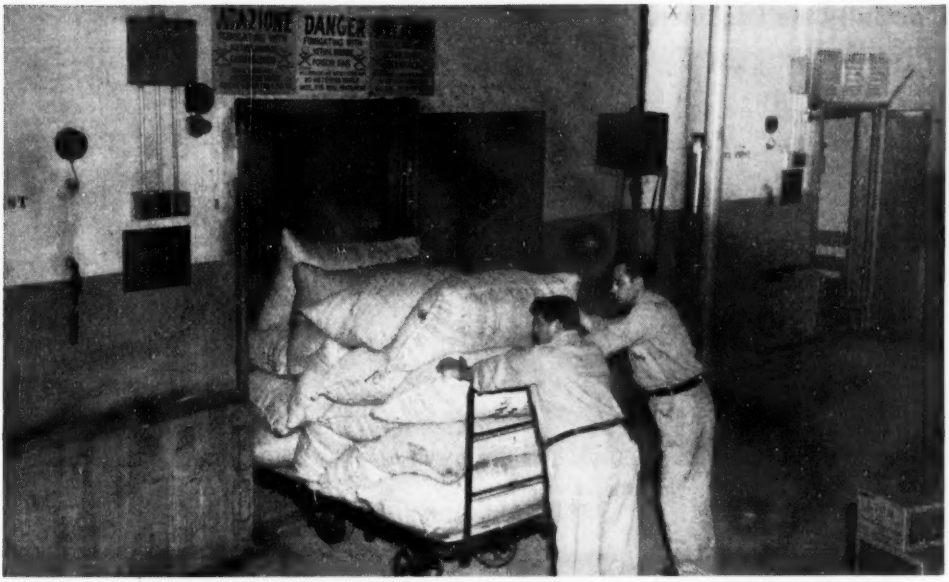
Paring of costs through astute attention to manpower provides a vital opportunity for a company to meet and surpass the performance of its rivals. Very few cost leaks are more expensive than those entailed by inefficient use of personnel. Therein lies the challenge.

Many different aspects make up the proper approach to effective human engineering in industry. Progressive plant managements strive to make the employees more efficient in their work and happy in their positions through—

1. **Well-defined personnel policies**
2. **Employee welfare funds**
3. **Employee pension plans**
4. **Profit sharing programs**
5. **Wage incentives**
6. **Clubs, suggestion systems, and house organs**

But also important—and too often overlooked—are promotion and guidance of the skills inherent in the employee. Since an end-product can be no better than its formula, so the worker can be no better than the abilities he possesses.

Farsighted companies are recognizing this fact. Like the company whose story is told here, they are demonstrating that there is much that can be done to improve the *performance of the individual*—through analysis and correction. And the black ink on their ledgers mirrors the wisdom of their policies.



TO GUARD both product and plant from infestation, all inspected raw material going into manufacture of candies at this A & P Tea Co. plant must first be fumigated in these company-built vaults. Methyl bromide is fumigant used.

FOOLPROOF CONTROL

Through Inter-Department Quality Cooperation

Adoption of a rigid, 5-way program—tying in laboratory, roving inspectors, production department, top management, and engineers—assures steady flow of A-1 candy products from A & P Tea Co. plant

JOHN V. ZIEMBA
Assistant Editor, "Food Engineering"

Engineered into candy making operations by A & P Tea Co. is a rigid quality-control system that—through inter-departmental teamwork—is now free of loopholes.

Today, this company, through one of its own manufacturing subsidiaries, Quaker Maid Co., in Brooklyn, has worked out a precise 5-way control over the quality of its multi-million pound annual candy output.

Here, briefly, is how this efficient control system works:

1. Control laboratory analyzes incoming raw materials, products at different stages of production, and finished goods. As a further safeguard on quality, sanitary inspections of the plant are made weekly by the chief chemist and superintendent of the candy factory.

2. Key personnel in the production department—supervisors and crew leaders—periodically inspect candies on processing lines and the manner in which they are packaged.

3. Roving inspectors—skilled candy-makers with over 25 years of practical experience—examine raw materials in production areas, products during manufacture, and processing technics.

4. Special test group, comprising top management, checks all items scheduled for shipment next day.

5. The engineering department develops new processes and adopts advanced equipment, both designed to improve products and make them more uniform.

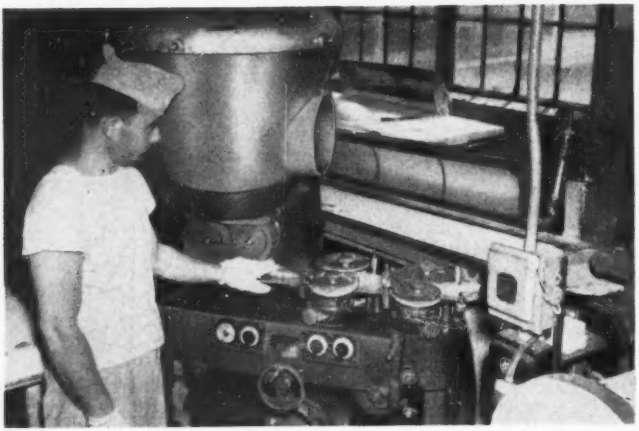
A detailed examination of this fool-proof quality-control program, launched and consolidated by J. H. Ungerland, vice-president and general plant manager, will bring the operations into sharp perspective:

Role of the Laboratory

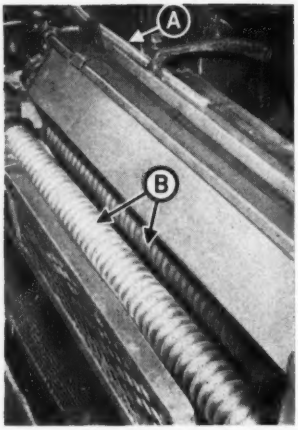
First of all, the control laboratory makes triple checks on ingredients, items in process of manufacture, and finished goods.

As for raw materials, items such as nuts, raisens, fruits, dry coconut, and cocoa beans are examined for evidence of mold growth, foreign matter, rancidity, and insect or rodent infestation. There is also checking for adherence to specifications on size, color, count, weight, and, in some cases, bacteria and yeast content.

Sour Ball Line Engineered for Speed, Uniform Quality

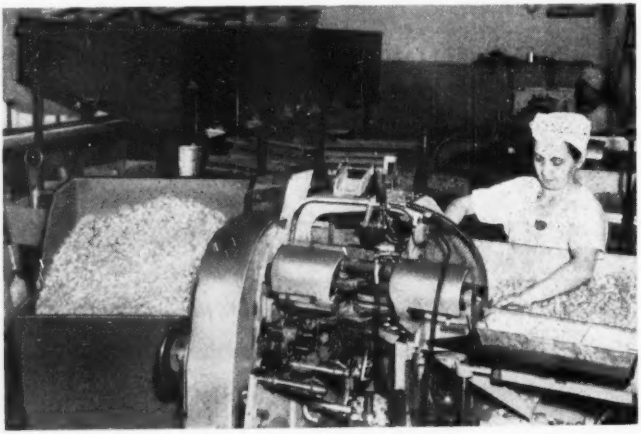


VERTICAL BATCH ROLLER forms hard candy into a rope. Draw-off rollers below forming machine feed pre-formed rope to two sizing rolls.



ROPE (A) is chuted to forming and cutting rolls (B) that shape the balls.

BALLS next pass over vibrating screens and are cooled by air ducts.



COOLED sour balls are fed into storage bins (background). Metal bin (right) carries candy balls from bins to wrapping machines for cellophane-wrapping.

The control laboratory has, in many instances, gone all-out to help the suppliers ship A-1 raw materials, knowing that therein lie the roots of quality.

Take the case of the cherries. Due to the methods used in plant operations, it was necessary for suppliers to make some changes in their products. And the laboratory worked with them. Through this cooperation, the candy plant was able to work out a more satisfactory product.

Analyzing products while they are in the process of being manufactured is the second check made by the laboratory. In compliance with USDA standards, for instance, analyses are made of the shell content of cocoa-nibs and chocolate liquor. Maximum shell content permitted in chocolate liquor is $1\frac{3}{4}$ percent.

Chocolate coatings are tested for fineness (particle size), viscosity, fat and liquor contents. Percentage of coating over centers and number of different pieces of candies are checked in boxes of assortments.

Moisture analyses are made of all batches of hard candy. Company specifications call for a very low moisture content to avoid subsequent graining or crystallizing.

Thin-mint centers are checked for moisture content and for the amount of the enzyme, invertase. This sugar-splitting enzyme is used to invert part of the sucrose sugar and thus increase the amount of syrup in the center. As a result, the centers have a softer texture and smoother consistency.

Moisture tests are also run on candy corn and similar items to prevent subsequent lumping or sticking together of these confections during the humid summer months.

Examination of finished goods is the third quality-control check undertaken by the laboratory. Two technicians rove about the candy factory, each picking up over 300 representative packages of candy. These packages go to the laboratory, where they are immediately check-weighed and the quality of the candy is evaluated.

Jelly beans offer an example. Determined are the number of beans per pound, number of the different flavored

pieces, percentage of sugar coating, and the amount of center used.

Through exhaustive tests, the laboratory has set-up shelf-life requirements for the different varieties of candies. The data were obtained here by holding packaged candies at varying temperatures over prolonged periods.

Great care is necessary and close supervision is maintained to make certain that consideration is given to all possible loss factors, such as moisture, at the time of packing, to insure the proper weight of product in the package when purchased by the customer.

Controlling Package Weights

There is no slip-up in putting out packaged goods with the correct weight. Every package is checked-weighed on all packaging lines—even those that are machine-weighed.

Then, as a check on production-line packaging, supervisors and crew leaders periodically check-weigh packages on the different processing lines.

As if that were not enough, a laboratory technician travels all over the candy plant, check-weighing at least 25 packages on each production line. Packages are weighed on a scale, mounted on a portable table.

Protecting the quality of candies through weekly inspections of the sanitation of the plant is one of the assignments of Chief Chemist George Richardson and Superintendent Fred Wagner. Examined in the course of these inspections are the condition of equipment, supplies, utensils, workers and their clothing, floors, walls, ceilings, and windows.

Continuous production-line quality control is the assignment of the operating department.

On each packaging line—whether it be for thin mints or chocolate-coated cherries in cream—a crew leader picks up packages about every 15 min. and check-weighs them. Appraised, too, is the general appearance of the candies and the packages.

How Inspectors Work

What's more, a supervisor (responsible for several production lines) follows up the checking of packages by his crew leaders. He also check-weighs packages. And in addition, he gages the efficieney of the operations—wrapping, coding of packages, and sealing of cases—and the quality of the products.

On each work-shift, a roving inspector circulates throughout the plant inspecting processing operations, candies, and packages. Whenever there is any question about quality, the inspector immediately contacts the supervisor and superintendent of the candy plant. Operations are stopped until the difficulty is rectified.

Examination of the quality of candies is also the last check given by a test group comprising general manager, manager, candy-plant superintendent, production-line supervisors, chief chemist, and roving inspector.

This group conducts 1 to 1½-hr. tests on all items for the next day's shipment. Packages are examined for neatness, coding, and proper placement of pieces and liners. Products are inspected for general appearance, taste, texture, and amount of coating.

For example, chocolate-coated candies are eyed for gloss, stroking, size, shape, and "flanges" or "foots"—unattractive protruding of coating at the bottom of the candies.

If this group detects candies that do not meet specifications, shipments are then immediately terminated until the source of trouble is discovered. The entire lot of candy involved is then thoroughly examined and a decision finally made to either reject or repackage it.

Now to the measures taken by the engineering department to assure production of quality confections:

Fumigating Incoming Materials

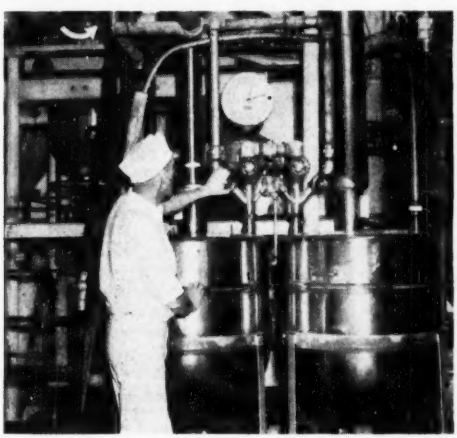
Prevention of infestation by fumigating incoming raw materials, such as nuts, fruits, cocoa beans, and similar products, was one of the significant operations worked out by the engineers.

Thus, upon arrival at the plant, pallet loads of raw materials are moved from the first-floor unloading area to the sixth-floor's 1,600 sq. ft. screening section, adjacent to the two fumigating vaults.

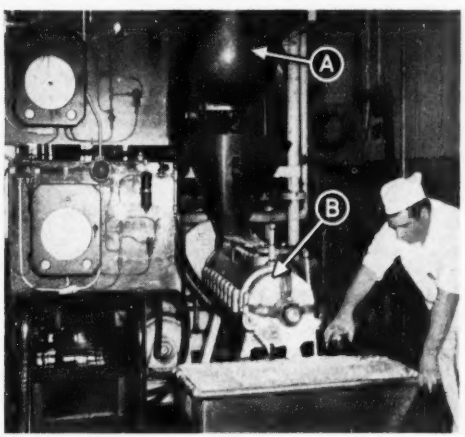
The materials are initially inspected by the laboratory for conformance with rigid quality and sanitary specification. They are then loaded onto wheelers that are rolled into the fumigating vaults. Size of each vault is 40 by 40 ft., and capacity is 20 wheelers. In the case of cocoa beans, each wheeler holds 25 100-lb. bags.

Methyl bromide is the fumigating gas employed. A 10-lb. charge of this gas is emitted into a vault for a 9-hr. period. Or, if there is a press for

Better Fondant by Continuous Process

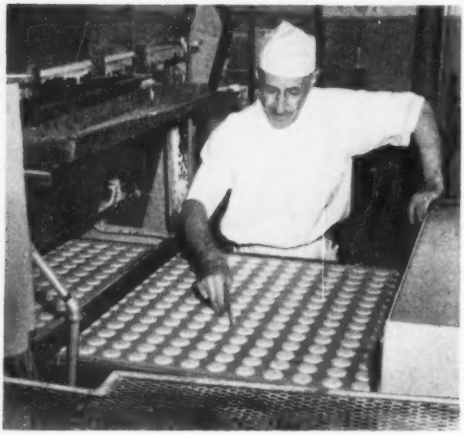


METERS deliver right amount of liquid sugar and corn syrup into these kettles. Premelted syrup is then concentrated in high-vacuum stainless steel kettle (arrow) for 10 min.

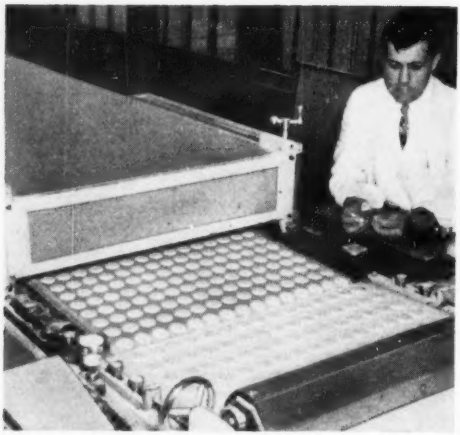


HOT FONDANT is discharged into receiving bowl (A), from which it is dumped into hopper feeding horizontal beater (B). Paddles in beater aerate and cool fondant to 110 deg. F.

Special Line for Non-Stop Output of Thin Mints

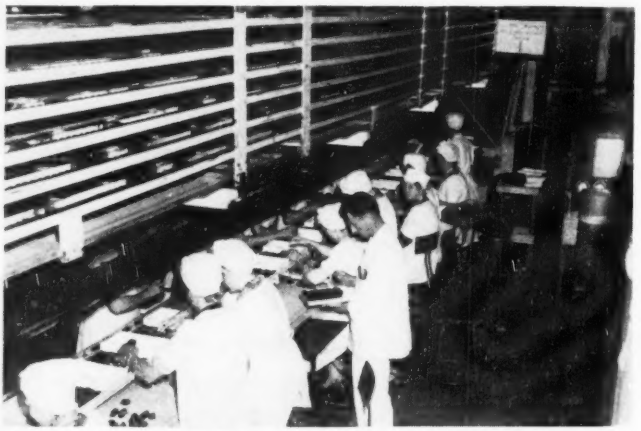


CREAMS are deposited, 15 at a time, onto conveyor. Eliminated is starch-casting. Above: Mints being measured.



LEAVING continuous cooler (left), mints are inspected as they are "unstuck" in transfer to another conveyor.

FLIP-OVER belt inverts mints before they go to enrober (rear).



CHOCOLATE-COVERED mints pass under an electronic metal detector immediately following cooling in multi-tiers (above). Mints are now packaged.

time, the amount of fumigant is doubled and the holding time halved.

After the vault is loaded with raw material, the door is closed and masking tape seals all cracks as a precautionary measure. Then as the air-intake is closed, a green light adjacent to the door of the vault goes out and a red light comes on, indicating that the fumigating system is ready for its charge of methyl bromide.

Before the fumigated materials are taken out, a fan exhausts the gas from the vault at the rate of 3,000 cu. ft. per min. Simultaneously, a blower forces in fresh air.

Three precautionary measures are taken: First, workers operating the vaults are licensed by the City of New York. Second, air inside the vault is tested by hooking up a halide detector to a testcock to determine presence or absence of fumigant in the vault. And third, the operator undoes the lock, merely cracks the door, and inserts the detector. If no gas is detected, he then opens the door all the way. A gas mask is worn by the operator.

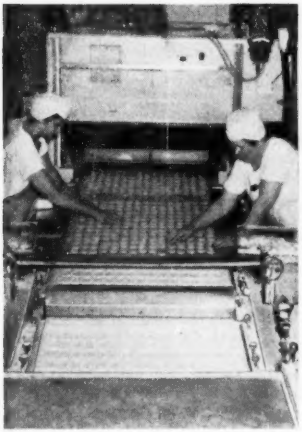
Special Hard Candy Line

Outstanding mechanical and engineering improvements have been made on the continuous sour ball hard candy line, on which 7,100 lb. are produced in an 8-hr. shift. Notable are the uniformity in the quality of the sour balls produced and the assortment of the five flavors packaged.

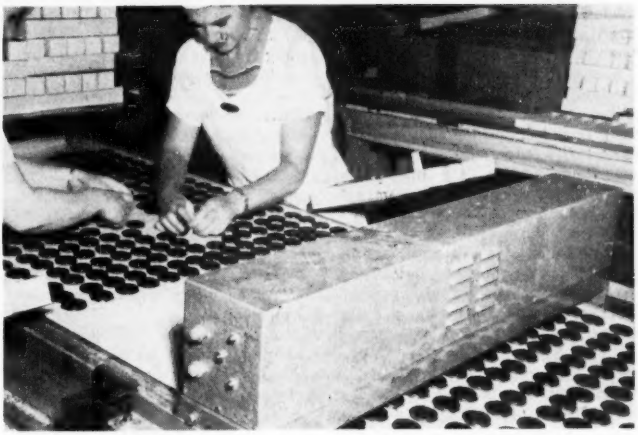
Sour balls are produced in this manner: Corn syrup and water are metered into 375-lb. premelt kettles by automatic meters of the pre-set type. Then sugar is added. And each batch, after preheating to 242 deg. F., is sucked into a vacuum cooker and then concentrated to a higher solids content under 28 in. of vacuum. Approximately 75-lb. batches are collected in aluminum pans.

Kneading of the small batches on a Berks Engineering Co. unit is the next step. Color, flavor, and fruit acid are added. Mixing and kneading are carried out as the batch rotates on a 44-in. dia. horizontal metal plate. Alternately, a vertical, metal reciprocating plunger with a level face flattens

Multi-Variety Coating Cuts Down Handling



BY FEEDING eight different type centers on belt going to enrober . . .



. . . **PACKAGING** of assortments is facilitated. Leaving enrober, chocolates go through cooler (top) onto packing line, where they are put up in boxes.

the candy and a pair of horizontal reciprocating scrapers scoop it into a ball.

The confection is now ready for sizing and cutting. Batches are fed into a vertical Hansella batch roller, designed for continuous feeding and sizing of the confection into a solid rope.

This unit is adjustable for making a rope of any desired thickness within a $\frac{5}{16}$ to $1\frac{1}{16}$-in. dia. range. Feeding speed is also variable from a $6\frac{1}{2}$ to a 78-ft. rope per min. Capacity of the electrically heated hopper is 90 lb.

In operation, twelve vertical, conical rolls form the candy into the rope. At the bottom of the batch roller, a set of draw-off rolls pulls the candy out of the unit. These rolls then perform and feed the rope to two sets of sizing rolls that bring it to the shape required for the forming machine.

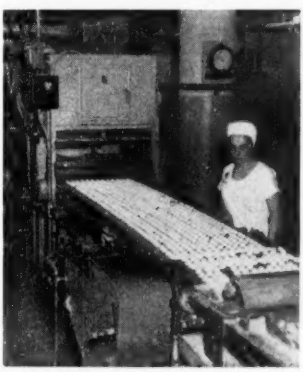
As the rope is delivered to a $1\frac{1}{2}$-in. wide belt, a revolving knife cuts it into 4-ft. lengths. Next, a pusher mechanism, synchronized with the speed of the belt, slides the rope pieces into a chute that feeds them crosswise between a pair of revolving, grooved forming and cutting rolls that rotate in opposite directions. These rolls divide the 4-ft. candy ropes into 48 pieces and roll the pieces into balls. Then, the sour balls pass over two vibrating screens in succession. In traveling over the first screen, three air-duct distributors cold-air quench the balls to prevent them from losing shape. The second screen removes small bits of candy and discharges the balls onto a 50-ft. cooling conveyor traveling through an air-conditioned room.

Cooled sour balls are then delivered by elevating and horizontal conveyors into seven 1,000-lb. storage bins, each holding a different variety of candy. From these bins, the different flavored sour balls are loaded into wire-mesh bottom trays. From these trays, the five varieties are dumped into a metal bin mounted on casters and then paddle-mixed. The bin is then rolled to a Package Machinery Co. wrapping machine. Here, the assorted candies go onto a wrapping machine feed table for further manual mixing. Then the balls are pushed onto a horizontal rotary disk with 24 pockets for machine-wrapping with heat-sealable cellophane.

Turning Out Quality Fondant

Efficient production of uniform quality fondant is now being achieved by a continuous process. The operation proceeds as follows; Liquid sugar and corn syrup are metered into two 375-lb. capacity stainless steel premelt kettles. Here, the syrups are heated to approximately 235 deg. F. Automatic temperature controllers terminate the cook in the premelt kettles. After a batch is premelted, it is sucked into a stainless steel vacuum kettle and concentrated for 10 min. under $29\frac{1}{2}$ in. of vacuum. The vacuum is then released and the batch is discharged to one of two stainless steel receiving bowls. Two receiving bowls are used to enable continual operation of the vacuum cooker.

From the receiving bowl, the hot fondant is dumped into a hopper feeding one of two horizontal beaters. Here, a series of paddles, mounted on a rotating shaft, aerate and cool the fondant to 110 deg. F. Fondant is then collected in stainless steel bins mounted on casters.



BOTTOMS of chocolate cherries are triple-coated to stop syrup leakage.

Continuous Thin-Mint Line

Quaker Maid has developed a high-speed, streamlined method of producing chocolate-coated thin mints. The technic eliminates the need for starch-casting the creams.

Also adopted on this line are five quality-control measures:—

1. Calibrating the diameter of cream centers deposited on a conveyor belt.
2. Inverting the centers for uniform application of coating by enrober.
3. Inspecting centers for defects prior to coating them.
4. Passing thin mints under an electronic metal detector.
5. Brushing the mints to eliminate finger marks.

Capacity of the 170-ft. thin-mint

line is 7,500 lb. per 8-hr. shift. This line also doubles for the larger individually-wrapped mints, which are turned out at the rate of 6,300 lb. per 8-hr. shift.

Now as to making thin mints: Fondant, sugar, and corn syrup are cooked to the desired temperature, flavor is added, and the mint cream is then gravity-fed into the hopper of the depositing machine. At this point, measured amounts of the cream are deposited, 15 pieces at a time, onto a rubber-belt conveyor.

Using a dial-top caliper, the operator of the depositing machine periodically measures the diameter of the creams.

Immediate and rapid cooling of the creams has done away with starch-casting. The conveyor carries the creams through two Masonite-enclosed cooling tunnels—the first 15-ft. long and the final one 90-ft. long. Blasts of room-temperature air do the cooling in the preliminary tunnel, and brine-refrigerated air (50 deg. F.) is circulated through the second unit to complete the job.

Automatic transfer of the slightly sticking mints from the conveyor going through the cooling tunnels to another belt feeding a flip-over conveyor was a problem solved by the engineering department. The second belt travels faster so as to pull the mints without damaging them—from the end of the cooler conveyor.

Before going to the enrober, mints are inverted to prevent "foots" or "tailings." By turning the mints bottomside-up, chocolate coating can be applied to the other side to give the candies a more uniform coating.

Mints automatically turn upside down during a 3-in. drop from the transfer belt (mentioned above) to the second short belt operating at higher speed. By moving faster the latter belt gets the mints out of the way of those falling from the slower belt. The mints now discharge onto a fourth conveyor, traveling at the same speed as the transfer conveyor.

Inverted mints next go through an inspection station, where two girls reject damaged ones. Chocolate coating is applied as the mints travel through a Greer enrober, and the coating solidifies as the mints are conveyed through a multi-tier cooler in an air-conditioned room. Leaving the cooler, the mints go under an electronic metal detector.

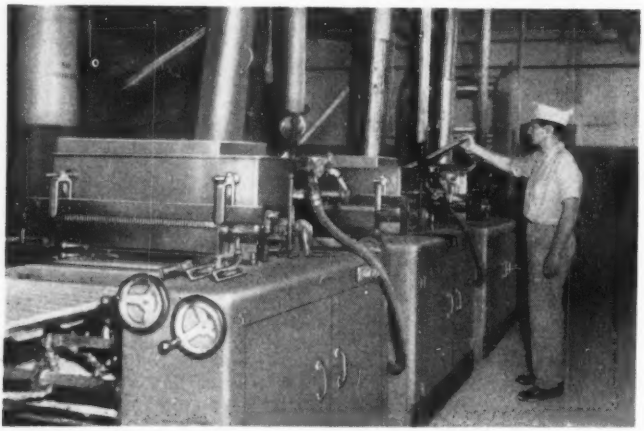
Packaging is the final step. Girls pick the mints off the conveyor belt, separate them with wax paper dividers, and pack them 28 to a carton. Three cardboard sections are inserted inside each carton to cushion the mints and minimize subsequent breakage. The candies are now brushed, a wax paper liner is applied, and the cartons are checked-weighed. Finally, the lids are put on and the cartons are machine-wrapped with heat-sealable cellophane.

Stopping Leakers

Seepage of the syrup portion of chocolate-covered cherries through the chocolate coating has been eliminated in two ways—by removing excess liquid from cherries before depositing them and by applying a triple coating to the bottom of the centers.

Excess liquor is removed from the surface of the cherries by spinning 5-lb. batches for about 3 min. in a laundry-type centrifuge (extractor).

Bottoms of the cherry-cream centers are triple-coated by conveying the candies over a bottomer and through two enrobers in succession. Coated candies then proceed through a multi-tier cooler, under three rotary brushes, and past a metal detector.



PRODUCED by these three depositors are 11,000 lb. of candy corn per shift. Each depositor forces creams into wedge-shaped impressions in starch trays. First depositor adds white cream and remaining units deposit orange and yellow creams.

Unique Assortment Line

Adoption of an assembly-line method of coating eight different types of centers with chocolate and then packing them into fancy boxes as the candies come off a multi-tier cooler,—while maintaining a pre-determined assortment—is a significant Quaker Maid contribution to efficiency.

Before this system was employed, an excessive amount of labor was required to pack an assortment of chocolates. What was done was this: Only one variety of centers was chocolate-coated, cooled, and packed into stock boxes. The boxes were then loaded onto racks that were rolled to a packing line, or its vicinity. These steps were repeated for other varieties until an assortment was completed. Then, an assortment of chocolates was packed from stock boxes into fancy boxes.

But now the technic is different: Eight varieties of centers are placed, in rows, on a conveyor belt carrying them under three rotary brushes to remove excess starch and over a bottomer, and through an enrober. From here, the chocolates are conveyed through a multi-tier cooler and then discharged onto the packing conveyor belt. Chocolates go under a metal detector before packaging.

Girls flanking the belt pack the chocolates in their proper places in cartons, each girl handling one variety of candy that goes into one spot. Each is individually paper-cupped.

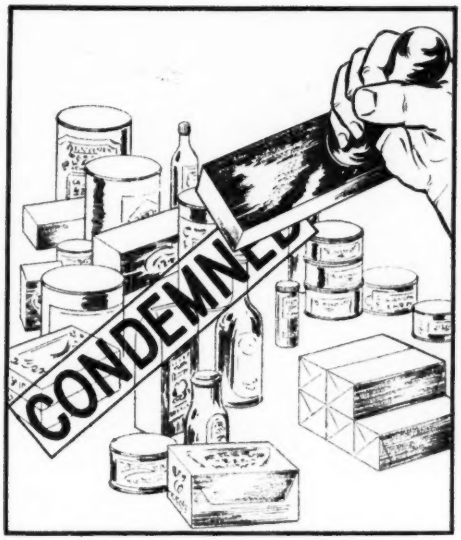
After the bottom layer is packed, a girl inserts a waxed-paper liner. Another puts in a cardboard liner. Then, the top layer is packed.

At this point, the eight varieties coming from the enrober have been packed into the cartons. To complete the assortment, other varieties are now packed from stock boxes. These stock boxes holding the eight additional varieties are mounted on portable tables, four on each side of the belt.

After the top layer is packed, the chocolates are brushed and girls insert waxed-paper liners and padded cushioning paper. Inspectors look over top and bottom layers during the packing operation, replacing any imperfect pieces and correcting any flaws in packaging. Finally, cartons are check-weighed, top lids are put on, and the packages are machine-wrapped in heat-sealable cellophane.

Building of a 3,000,000-lb. capacity air-conditioned storage room—to hold the 200,000-lb. weekly output—has

(*Turn to page* 166)



It Can Happen to You, So Here Are—

"Just-In-Case" Tips On Condemnations

JOSEPH WINSTON and JAMES J. WINSTON

Respectively, Member of New York and Federal Bars; and Director of Research, National Macaroni Manufacturers Assn., also Director, Jacobs-Winston Laboratories, Inc., New York City.

Condemned is a stamp that no food manufacturer ever expects on his product. But there's always a possibility that a processed food may become contaminated—even despite precautions.

Then it is the lawful duty of the Food & Drug Administration to step into the picture. This group is charged with the responsibility of protecting public health in regard to all interstate food shipments.

Under the Federal Food, Drug & Cosmetic Act of 1938, it is a misdemeanor if the food being processed . . .

■ **Consists in whole or in part of any filthy, putrid, or decomposed substance unfit for human consumption.**

■ **Has been prepared, packed or held under insanitary conditions where it may have become contaminated.**

Neither lack of intent to violate the law nor lack of personal knowledge of the violation constitutes a legal defense. In short, compliance with the law rests squarely upon the owner or operator. F&DA can, if necessary, condemn a product, issue warnings and fines, and bring criminal suit under the Act.

As the Supreme Court once summarized (*U. S.* v. *Dotterweich 320 U. S. 277*): "Such legislation dispenses with the conventional requirement for criminal conduct-awareness of some wrongdoing. In the interest of the larger good, it puts the burden of acting at hazard upon a person otherwise innocent but standing in a responsible relation to a public danger."

The unfavorable publicity and notoriety resulting from a sanitation conviction will inevitably result in loss of sales and in cancellation of orders. And if convicted, the first-offense violator may be imprisoned for one year and/or fined $1,000, and for a second offense he may be imprisoned for three years and/or fined $10,000. The government may also obtain an injunction restraining the manufacturer from further business until he has complied with the law.

Hearings—Best Bet for Defense

The Statute provides that before any criminal proceeding is started the person involved may receive an appropriate notice and an opportunity to present his views with regard to the contemplated proceeding. But the courts have held (*U. S.* v. *Commercial Creamery, 43 Fed. Supp. 714*) that the government can proceed against a violator without affording him this preliminary hearing.

In practice, the F&DA sends a written *Notice of Hearing* specifying certain violations that are alleged to have occurred in certain interstate shipments.

The charge sheet, attached, is usually broadly phrased, such as, "The food contains insect fragments," or "The food was prepared in a factory infested with insects which may have contaminated the product."

The person receiving a *Notice* is not legally required to appear or to offer any evidence. But the inevitable consequence of failure to appear is criminal prosecution. Since a hearing at this stage does not entail any unfavorable publicity, sound policy dictates an appearance and a vigorous defense.

Before any hearing, the defendant should make a written request of the administrator for a portion of the official sample of the alleged insanitary food. The owner should have this sample analyzed by his own chemist and have the results of this examination with him at the hearing.

Regulations require (with certain exceptions) that the agency collect at least twice the quantity of the food estimated to be sufficient as a sample for analysis. Failure will nullify a case (*Triangle v. U. S., 144 F (2) 195*).

Be Able to Back Up Your Facts

Preceding a hearing, counsel for the manufacturer should become thoroughly conversant with the technical details of the process used. In this connection, he should ascertain from the plant chemist the incidence of foreign matter or insect fragments in the *raw* material.

If the *finished* product contains, roughly, the same incidence, then it may be concluded that it was not an insanitary condition of the plant that caused the alleged violation. While the Statute does not permit any tolerances for most foods, as a practical matter some latitude usually is granted.

The owner should also produce, in triplicate, all records and data relating to his efforts over the years in maintaining a sanitary plant. Relevant are all receipted bills for

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PRACTICAL QUESTIONS THAT GET THE SPOTLIGHT

If your product *accidentally* becomes contaminated, can you be summoned?

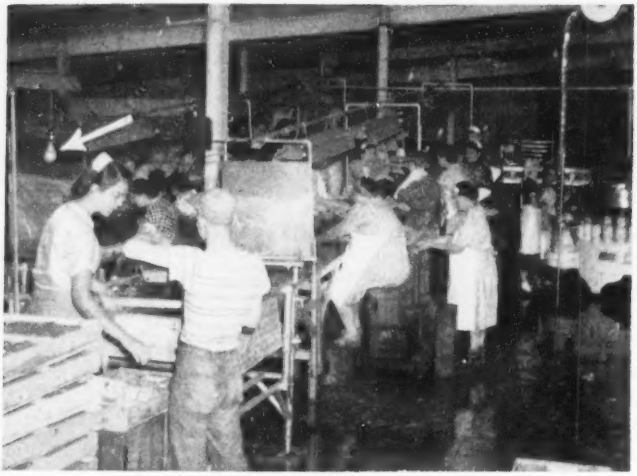
What's the best way to avoid unfavorable publicity when accused?

Can you request an informal hearing in lieu of court action?

What plant records should be presented during an F&DA prosecution?

Will the Administration let you have samples of the alleged adulterated food?

Under what conditions may you expect a warning instead of a fine or jail sentence?



FLASHING LIGHT (see arrow, left) tells feeders how fast to dump quarts. Berries travel past sorters to filling and syruping units that are synchronized with feed by hand-wheel adjustment of variable-speed drive.

FOREMAN sets pace by adjusting timer in his office to regulate frequency of feed-in light flashes.

Output Trebled, Damage Trimmed by

SYNCHRONIZED FILLING LINE

Advanced filler and ingenious production-line timer permit the packaging of tender berries at rate of 200 containers a minute. Other benefits cited

FRED GRANGER, JR.
Production Manager, Producers Service Corp.
Benton Harbor, Mich.

Mechanized speed in the packaging of berries for freezing has a major drawback—bruising.

Gentle care in picking and crating, plus quick delivery to the plant, contribute to top quality. But these gains can be completely wiped out in the filling operation. For any method of dumping, scooping or pushing—even tumbling—soft, delicate fruit, such as red raspberries, is apt to result in degrading bruises.

And when you try to speed up filling operations to mesh with flush deliveries from the field, the damage increases in geometrical proportion.

With sizable freezing facilities geared to volume handling of more robust fruits and vegetables, berry packing always has assumed the aspects of a major bottleneck here at Producers Service Corp., Benton Harbor, Mich. But over a period of years we have developed ideas for safe, rapid handling of this delicate product. And a new berry filling line incorporating these improvements was installed last spring for the 1951 berry pack.

Results with this new system of packing—based on the use of a high-speed volumetric filler and synchronized, timer-controlled berry feed—have exceeded expectations. Here are the concrete advantages:

- **Quality is vastly improved**—by reducing texture losses more than 25 percent.
- **Production tripled**—line now packages up to 200 containers per minute.
- **Labor costs cut**—"gearing" of personnel to fruit supply has eliminated dead time.

In developing the new line, the first problem to be licked was in the filling operation itself. Formerly, we employed the "round-table" system. As berries tumbled into this filler table from the washing and grading line, girls would push a judged quantity through holes in the table and into moving containers below.

Despite the extreme caution exercised by the girls, a good proportion of the berries was crushed in the package. What's more, weight and volume of fill varied over a wide range.

20-Station Filler Used

An Atlas Pacific 20-station filler and syruper—first east of the Rockies—was selected to mechanize this operation. Special advantages for handling tender berries are inherent in this volumetric unit. It is equipped with open-top, exact-volume cups which discharge, with little pressure, into containers traveling below. And a simultaneous air purge of each cup occurs during filling to assure a gentle and complete removal of adhering berries.

Efficiency and exactness in this filling system is evidenced by weight control to within ½ oz., even when running at our present plus capacity of 200 per minute.

But mechanized filling created a drastic problem all its own. True, lit-

OPERATOR adjusts filler to dumping speed by turning wheel (in foreground) with left hand while guiding berries to filling cups with right hand. Entire line can be stopped by pushbutton (near operator's head).

tle bruising of fruit would occur if just enough reached the station to evenly fill the discharging cups. However, if the supply exceeded the filling rate, the buildup of berries above the cup would be enough to damagingly crush the fruit. And, of course, too slow a feed to the filler bowl meant underfilled cartons.

Solution here was to employ a Reeves variable-speed drive at the filling station, with an easily adjusted hand-wheel by which an attendant can gear filling speed to berry supply. Thus, the girl stationed at the filler bowl to guide berries into cups with right-hand action can also "trim" the filler speed by an adjustment with her left hand.

To the amazement of all, the filler girl has developed skilled use of her left hand—thus is now ambidextrous. For by using her judgment and adjusting the drive adroitly, her right arm has little to do. The berries—as well as the girl—benefit.

Operations Synchronized

Installing a flexible filling system did not overcome all evils. First of all, even the variable-speed drive could not accommodate extreme variations in quantities of berries fed to the line. Further, heavy changes in culling rate at the grading conveyor—due to varying fruit quality—had a pronounced effect on the amount of fruit reaching the filler.

The problem seemed to boil down to one of synchronizing the amount and quality of incoming fruit to the sorting and filling operation. Controlled dumping of berries on the feed-in conveyor was the obvious answer.

When you start filling 12-oz. containers at a rate of more than 100 a minute, small variations in the line's feed rate are magnified greatly in the actual amount of fruit traveling down the line. So to put the latter on an exact basis we devised a light-signal feed-in timing system.

First we rigged up an electronic timer which easily can be adjusted to produce a desired number of electrical impulses per minute. This unit includes two ranges—20-200 and 125-600 impulses per hour. Located in the foreman's office, it actuates a photo-flood bulb directly between the two fruit feed-in stations.

A thyratron-operated relay is the heart of this home-made timer. Its pulse frequency is varied by adjustment of rheostat knobs to change the charging rate of a condenser in the vacuum-tube circuit. While simple, this timer is more precise and accurate than a similar mechanical arrangement. It offers the further advantage of very easy and instant adjustment.

Works With Other Products

Besides raspberries, other berries and some vegetables, too, already have proved equally suited to this synchronized-line technic. The same savings through averting of damage and better weight control also have applied to strawberries. And the timer-controlled dumping arrangement has shown excellent adaptation to—of all things—asparagus. In this latter case, timed feeding has avoided a great amount of bruising by eliminating the need for hand alignment prior to filling.

Foreman Sets the Pace

From his office, the line foreman has complete control of the filling rate. After judging the quantity and quality of incoming fruit, he selects the appropriate light-flash frequency. This, in turn, sets the pace for periodic dumping of fruit onto the line feed-in conveyor.

One immediate improvement provided by timed feed-in was the switch from crates to quarts in dumping. Without timing, it would be almost impossible to feed quart quantities in a uniform stream. So the great amount of bruising resulting from bulk dumping was immediately eliminated by the new, practical system of small-quantity line feed.

Most remarkable aspect of the new system is the ease with which the line adjusts to changed conditions. The foreman, because of a flood of incoming top-quality fruit, may up the light signal rate from 360 to 540 flashes per hour for example. Attendants at the dumping station unconsciously adjust to the new speed—an increase in feed-in of about six baskets per minute, since two are dumped at each light flash.

Fruit then travels along two automatic-washing and hand-sorting belts to the filling and syruping operation. If the speed-up requires it, more girls are assigned to sorting belts by the foreman. But usually the rate change is so imperceptible that the sorters also fall into the faster pace without feeling hurried.

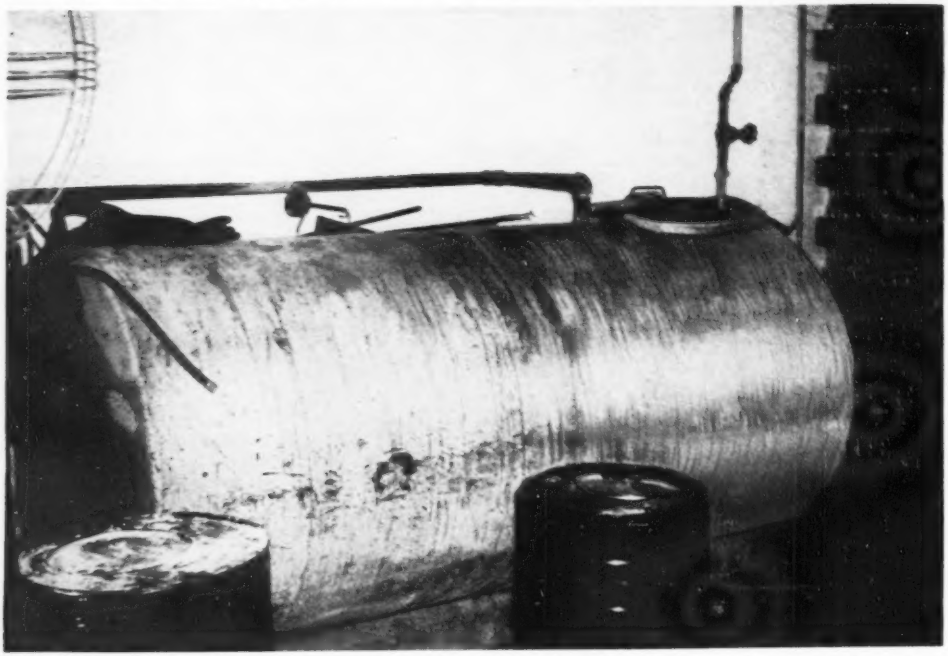
Filler Attendant "Trims" Pace

Most acutely aware of a change in the line's timing will be the girl at the filler. Her job is to see that only about a 5-sec. supply of fruit is in the filler bowl at any time to avoid crushing of the berries. When an excess supply of berries enters her station, her left hand intuitively will "trim" the drive adjustment wheel and speed up action of filler and syruper. Meanwhile, she also will be carefully distributing the flow of berries into the filler to prevent an over-layer in each cup.

However, shortly after the new pace is set, filling will come into balance with line conditions, and the critical job of attendant will be eased greatly. As a safeguard, the master start-stop button for equipment on the line is located within reach of

(*Turn to page* 155)

Just an Old Gas Tank—But Plays Key Role in Food Plant



HAZARDOUS washer-charging operation is eliminated and plant operations improved by use of this tank to prepare concentrated caustic solution for soaker unit in bottling plant

Predissolved Caustic

Brings Bottlers Numerous Benefits

Man-hours are saved—dollars too—by use of concentrated caustic solution to maintain needed strength in soaker-washer. Three inexpensive systems detailed

HARRY E. KORAB

Technical Service Director, American Bottlers of Carbonated Beverages, Washington, D. C.

By dissolving their caustic before adding it to the soaker-washer, bottlers gain many advantages.

- **An appreciable saving is thus effected in labor cost.**
- **Since the concentrated solution disperses throughout the soaker solution very rapidly, there is a saving in caustic as well.**
- **Washer solutions can be kept closer to the most efficient operating strength due to the ease of adding make-up during the operating day.**
- **Also, handling by this method is less dangerous to the operators.**

The conventional method of adding caustic to a bottle washer consists of pouring (by bucket or shovel) a predetermined number of pounds of the dry product into the alkali tank of the unit. This system is not only time consuming—resulting in increased labor cost—but also constitutes a risky method of handling.

Moreover, a test for the determina- of alkaline properties cannot be made immediately, since time is required for the caustic to completely dissolve and to be evenly distributed throughout the solution.

Generally, some of the caustic will sink to the tank bottom, forming a solid mass which may take a couple of hours to dissolve. If a minimum strength is being maintained for bottle sterilization, one can readily see that the full value may not be reached as long as any caustic is undissolved.

To emphasize the savings in man-hours by predissolving, I will cite an actual example: In a certain plant using approximately 51,000 lb. of caustic per year, man-hours required to clean, lubricate and add dry caustic to the two washers totaled 40 per week. But after installing the predissolved system, only 15 man-hours were required.

This 25 man-hours saving was attributed directly to the ease of preparing a concentrated caustic solution and pumping it into the washer.

The simplest system for predissolving caustic is shown in Fig. 1. Here, any shape tank can be used, with location wherever convenient. However,

Three Inexpensive Systems That Cut Caustic Costs

LEGEND: (A) (B) (C) Gate valves or cocks (iron); (D) Pump (iron); (E) Feed, tank to pump (iron); (F) Return to tank; (G) Gage glass; (H) Measuring tank; (I) Overflow; (J) Washer Valve; (K) Motor control switch.

FIG. 1

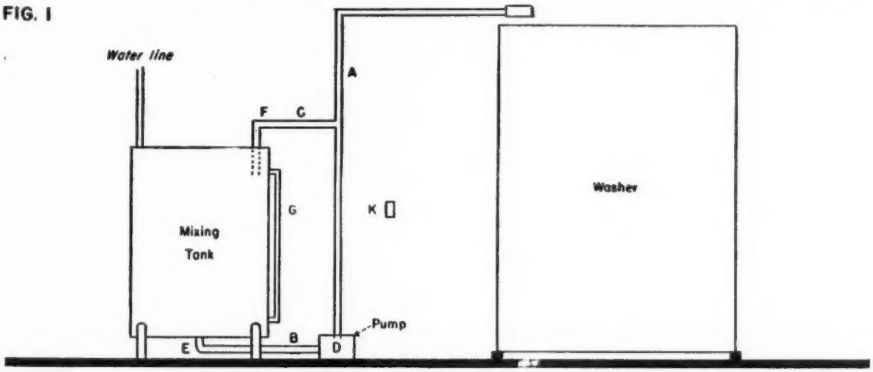


FIG. 2

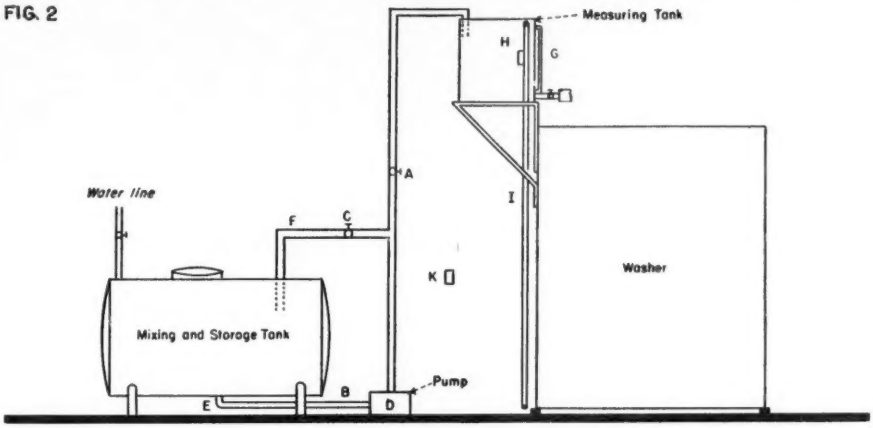
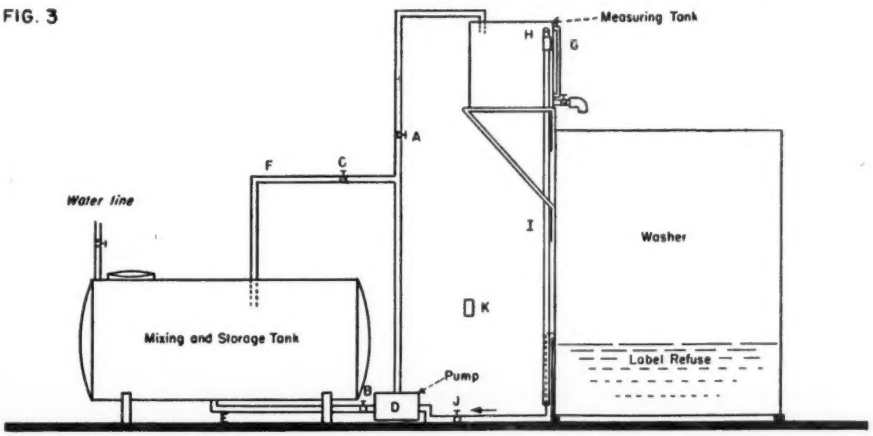


FIG. 3



placement should be as close to the washer as is practical. As a preliminary step, the mixing tank should be filled with water and the gage glass marked in 2½ and 5-gal. divisions up to 90 gal. (in a tank used to make up 100-gal. quantities).

In preparing a concentrated solution, 70 gal. of water are put into the mixing tank. With gate (A) closed and (B) and (C) opened, the pump (D) is turned on, thereby allowing the water to flow from the tank through pipe (E) and be returned through pipe (F). Then 400 lb. of caustic is slowly added over a period of 10 to 15 min., with the pump allowed to circulate the mixture until all caustic is dissolved. This will require 20 to 30 min.

Immediately after the caustic is dissolved, the solution will have a total volume of 85 gal., due to the displacement caused by the caustic and the temperature rise which takes place. Upon cooling to 68 deg. F., however, the total volume will shrink to 82 gal. The solution will have a strength of 40.7 percent and will contain 4.88 lb. of caustic per gallon.

Since caustic hydrate in a 40.7 percent solution will begin to settle out at 59 deg. F., the solution should be stored at a temperature of 60 deg., or above.

The percent caustic present in the concentrated or stock solution may be determined with ABCB caustic test tablets. However, it will be necessary to dilute the stock solution before making the test. The simplest procedure is to mix 10 cc. of solution with 90 cc. of water and run the test in the usual manner. A reading of 5 percent will indicate that the stock solution contains 50 percent caustic.

Additional detergents, such as trisodium phosphate, may be dissolved in the caustic solution if desired. For example, if 15 percent trisodium phosphate per pound of caustic is desired, 50 lb. should be added with the 400 lb. of caustic.

To pump all or a portion of the concentrated solution into any compartment of the washer, gate (C) is closed and gate (A) opened. Two men may be required when adding predissolved caustic by this method,—one at the supply tank, where the motor control switch (K) is located, and the other on top of the washer to feed solution into the proper soaker compartment.

Material cost for installation of this system is estimated at $125. In one case, the saving resulting from installation of this system amounted to 6 man-hours per week.

One-Man Method

Another system is shown in Fig. 2. It is essentially the same as that illustrated in Fig. 1. However, only one man is required for its operation if two motor control switches are used or if the sight glass (G) on tank (H) is placed in such a position that it can be observed from the motor switch located near mixing tank.

Procedure for dissolving caustic in the tank is identical with that in the previous unit. Then, a portion of the concentrated solution is pumped into tank (H). (An empty caustic drum, containing a gage glass marked in 2-gal. divisions, will work very well for this purpose.) From there, the solution is gravity-fed to any compartment of the washer by means of either a hose or permanent pipe manifold distribution system having an iron gate or cock over each compartment. To guard against improper operation of the motor control switch, an overflow pipe (I) should be installed, as shown, on the measuring tank.

Third Way

For those who use paper-labeled bottles and, therefore, must dump the alkali solutions more frequently due to the build-up of label refuse in the washer, the system shown in Fig. 3 is particularly advantageous. With this method, the solution above the label refuse can be drawn off by opening valve (J). And, after the refuse is removed from the washer the solution can be returned with an additional amount of concentrated caustic added to bring the solution up to the desired strength.

The number of times that a portion of the alkali solution can be re-used varies with the size of the alkali tank and number of bottles washed. It can only be determined by observing the amount of physical dirt present.

Generally, however, the solution drawn from above the label-refuse level can be re-used at least two times before it will be necessary to completely dump the entire solution.

As an economy measure, consideration may be given to the purchase of a used tank for predissolving caustic. In one instance, a 1,000-gal. gasoline storage tank was purchased at a cost of $90.

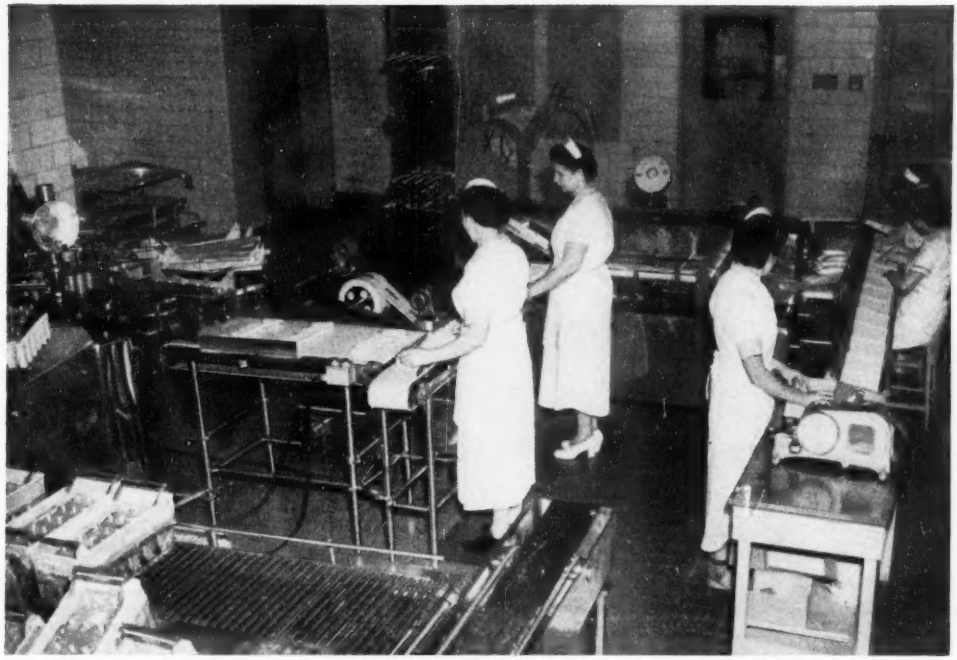
The above article is taken from ABCB Technical Service Report, "Schemes for Dissolving Caustic Before Addition to Bottle Washers." This report was prepared for use of members of the association.

GALLONS OF CONCENTRATED CAUSTIC SOLUTION (Prepared By Dissolving 400 Lb. Dry Caustic In 70 Gal. Water) To Add To Washer To Obtain Desired Strength In Soaker

Soaker Tank Capacity Gallons**	Caustic Content of Dry Compound*											
	100 Percent				90 Percent				80 Percent			
	1.5 Percent	2.0 Percent	2.5 Percent	3.0 Percent	1.5 Percent	2.0 Percent	2.5 Percent	3.0 Percent	1.5 Percent	2.0 Percent	2.5 Percent	3.0 Percent
100	2.5	3.3	4.1	5.0	2.7	3.7	4.6	5.5	3.0	4.0	5.0	6.0
125	3.1	4.2	5.2	6.2	3.4	4.8	5.7	6.8	3.7	5.0	6.2	7.5
175	4.4	5.8	7.2	8.7	4.8	6.4	8.0	9.6	5.2	7.0	8.7	10.5
200	5.0	6.6	8.3	10.0	5.5	7.3	9.1	10.9	8.0	8.0	9.9	11.9
225	5.8	7.4	9.3	11.2	6.6	8.2	10.3	12.3	7.0	9.0	11.2	13.4
275	6.8	9.1	11.4	13.7	7.5	10.0	12.5	15.0	8.3	10.9	13.7	16.4
300	7.4	10.0	12.4	15.0	8.2	11.0	13.7	16.5	8.9	12.0	14.9	17.7
325	8.1	10.8	13.5	16.2	8.9	11.9	14.8	17.8	9.8	13.0	16.1	19.5
375	9.3	12.4	15.5	18.6	10.2	13.6	17.0	20.4	11.2	14.9	18.6	22.6
400	9.5	13.3	16.6	19.9	10.9	14.6	18.3	21.8	13.0	15.9	20.0	24.0
425	10.5	14.1	17.6	21.1	11.6	15.5	19.3	23.3	12.7	16.9	21.1	25.4
475	11.8	15.8	19.7	23.6	13.0	17.5	21.7	26.0	14.2	18.9	23.6	28.6
500	12.4	16.6	20.7	24.8	13.6	18.2	22.8	27.4	14.9	19.9	24.9	29.8

* Determine, either from the label on barrel or by manufacturers statement, percent caustic in particular compound used.

** Ascertain either from catalog or (preferably) by actual measurement capacity in gallons of each caustic tank up to a fixed mark on each gage glass or any other type marker indicating solution level. If the volume is given in cu. ft., multiply by 7.5 to convert into gallons. One gallon of water weighs 8.3 lb.



STICK NOVELTY OPERATION in plant of Breyer Ice Cream Co., Philadelphia, Pa. shows (l. to r.) progress of products from freezing molds to final package. Machine (rear) automatically wraps and heat-seals each unit.

Improved Wrapping Operation

Seals Ice Cream—Stick, Too

Large processor uses modified candy-wrapping machine to overcome difficult packaging problem. Reaps benefits in lowered costs and improved acceptance

ARTHUR V. GEMMILL
Associate Editor, "Food Engineering"

Overall wrapping of stick novelties and ice cream sandwiches is now the order of the day at all Breyer Ice Cream Co. plants.

And, in addition to the sanitary protection afforded by this type package, numerous other benefits have resulted from the change. Outstanding among them are:

■ 1. Better control over inventories, because the original 1,500 doz. per hour operation has been converted to dual 750 doz. lines

■ 2. Greater volume of flow through the processing lines, because the wrapping machines now "set the pace"

■ 3. Increased output per man-hour, because interruptions have been minimized

Today, in addition to bulk ice cream in 10-qt. paper-board containers and that packaged in pint, quart, ½ gal. and 1-gal. paper cartons, a considerable volume of Breyer products go into individual size portions. Among these are ice cream sandwiches and "stick" novelties such as chocolate coated ice cream, creamsicles, fudgsicles and ice pops. These items have always been packaged in open-end bags.

Several pieces of equipment are available for the production and bagging of these products. However, company officials held the view that such items should be given the same protection as the other packages—an overall wrap.

Therefore, they set out to study each operation involved in the production of stick novelties. Objectives of the study were to:

1. Develop a new type package to replace the bag in which these items have been historically packed.
2. Attain more efficient use of materials, supplies and labor
3. Minimize waste
4. Increase flexibility of the operation, and
5. Improve sanitation and reduce mechanical maintenance

The various wrapping machines on the market were carefully examined in an endeavor to find one that would fit into their operation. And, while there were many that might perform the function of wrapping the products, it was difficult to visualize how

Closeup of New Wraps

COMPLETELY SEALED packages now meet requirements of all health departments. Top: Both chocolate covered bars and sticks of Breyers Junior Pops are enclosed in sealed bag. Above: Ice cream sandwiches are also protected from producer to consumer.

these intricate machines might be redesigned so as to meet the sanitary requirements of the ice cream industry.

Such a machine would have to be made by an organization willing to re-engineer the equipment so as to isolate the mechanical parts from the area in which the products were handled. It would be necessary that a minimum of parts be in contact with, or adjacent to, the product. All outer surfaces and parts would have to be so designed and constructed as to present a smooth surface that would be self-draining and easily cleanable. All parts would have to be easily removable for daily cleaning and sterilizing.

Steps Involved in Development

It was not until after World War II that a manufacturer was located who had a wrapping machine that could be so converted, and who was willing to understake the assignment.

This concern, Hudson Sharp Machine Co., Green Bay, Wis., developed a prototype ice cream wrapping machine and delivered it in 1948. With this machine, extensive experiments were conducted over a period of several months. Both MSAT Cellophane and glassine, to which a thermoplastic heat-sealing compound had been applied, were used.

The wrapper was a precision machine in that it had to be fed constantly at a selected rate of speed up to 750 doz. per hour. Therefore, a suitable feeding mechanism had to be designed. This consisted of a short, white Neoprene belt 18-in. wide, operated at a constant speed. Upon this belt were deposited rows of the product to be wrapped. Each row was subsequently transferred to a 7-in. wide feed belt operated by a variable speed drive. This belt was synchronized with the speed at which the wrapper was being operated and could be varied to compensate for differences in sizes of products being wrapped.

Following extensive trials, in which various changes were made to comply with sanitary regulations, orders were placed for ten of these units.

After the machines were delivered and placed in operation unexpected shortages developed in both the wrapping materials and heat-sealing compounds that had been found satisfactory. This necessitated further experimentation.

Finally adopted was a 28-lb. bleached sulfite paper coated to 36-lb. with a thermoplastic applied to one side. This material is easily handled in the machines, has low vapor transmission at ice cream cabinet temperatures, and is resistant to breakage during the wrapping operation.

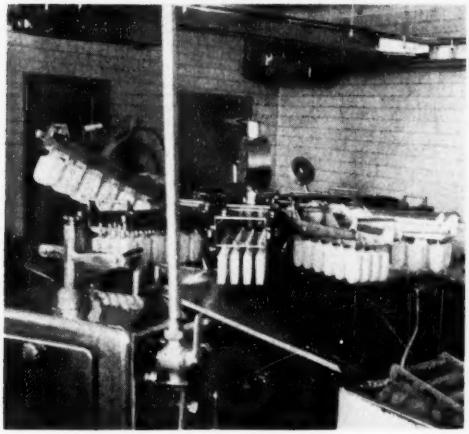
Processing Outlined

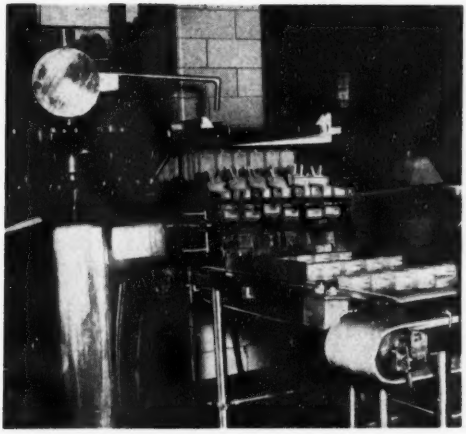
Now, let us regress and consider how stick novelties are made. First operation is processing of the mix which then flows to continuous freezers that supply the mold fillers in the novelty-making room.

Molds in which the novelties are frozen contain 24 individual compartments or pockets. These compartments are automatically filled with soft ice cream when the mold is positioned under a filler. Then, as the filled mold moves to the freezing tank, an operator inserts a holder that was previously loaded with 24 sticks. The result is a unit of 24-portions with a stick in the center of each.

In the Breyer plants mold fillers are located between two freezing

From Freezing Tank to Final Package

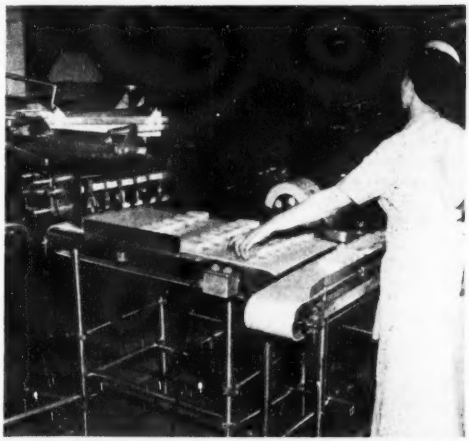




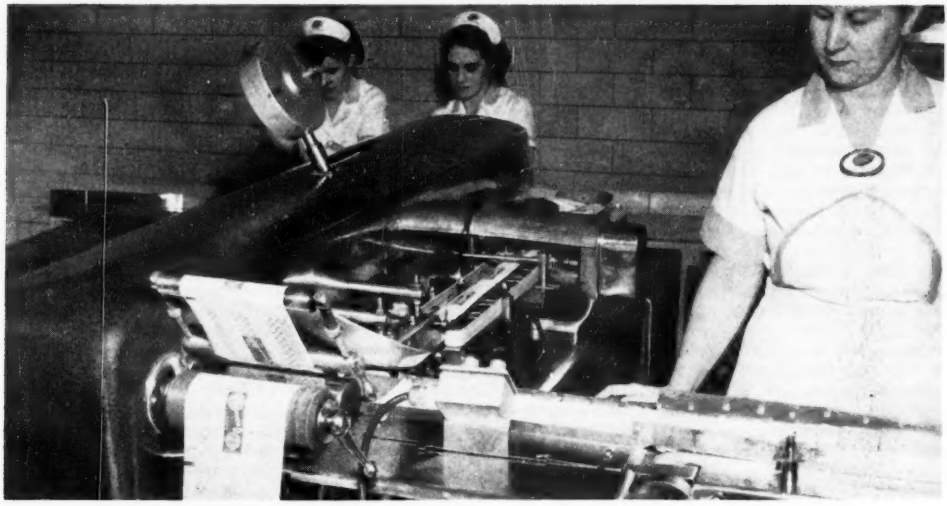
1 **HOLDERS** containing 24 stick bars pass through dipping-drying cycle on specially designed rotating unit having capacity of 750 doz. novelties per hour.

2 **STICKS** (top right) are released from holder at end of cycle and bars drop into compartments of positioning unit that deposits them in rows of 6 on Neoprene belt.

3 **OPERATOR** (right) carefully positions bars on feed belt to insure their continuous flow into the new, automatic wrapping machine.



4 **NOVELTIES** move from feed belt into machine where wrapping material is formed into continuous tube around them. Tube is then heat-sealed and a combination crimper and knife cuts off individual packages and, at the same time, crimps and heat-seals both ends of them. Wrapped, sealed products are discharged in a continuous stream onto packing conveyor where operators (rear) place them in cartons.



tanks, with conveyors feeding empty molds from the discharge end of either, or both. When filled, the molds are moved to the in-end of these shallow, open-top, insulated tanks. Brine, at —35 deg. F. enters at the charging end of these units and flows in the same direction as the molds move. Depth of brine is controlled so that the pockets of the molds are entirely submerged. In the bottom of the tanks are tracks in which the molds move toward the discharge end.

As soon as nine molds are assembled at the in-end of a tank, an operator pushes a button which actuates a device (Lowerator) that lowers the molds into the brine. A pusher bar then moves the row of molds forward onto the tracks in the bottom of the tank, returns to its original position, and causes the Lowerator to move up out of the tank ready for another 9-mold load.

With each movement of the pusher bar, all molds move forward in the brine and eventually are discharged from the tank. Each mold remains in the brine approximately 13 min., during which time the ice cream in each pocket freezes solidly to the stick.

As the molds are pushed from the tank, they are automatically deposited on a conveyor which moves them to the demolder. Here, they are immersed in hot water to loosen the frozen products, which are then lifted from the mold in a 24-pop unit attached to the stick holder.

New Dipping Units

Formerly the departments were set up with two separate brine tanks, but laid out for production of only one item at a time, at a speed of 1,500 doz. per hr. With installation of the new wrapping machines having top capacities of only 750 doz. per hr., the setup was changed so that each tank now comprises a unit. Since six different stick novelties are made, this permits production of two of these items at one time.

To complete this change-over, however, it was necesary to install two new dipping units with capacities approximately those of the wrappers. And, since space was at a premium in the novelty manufacturing room, straight-line units had to be ruled out. The engineering department, therefore, designed and built circular units (see accompanying photo) which employ revolving conveyors to chocolate-coat, dry, and discharge the stick novelties.

As soon as the stick holder (with its 24 pops) is lifted from the mold in the demolder it is placed in the brackets of the revolving conveyor of the dipping machine. This conveyor moves it to the dipper where each piece is immersed in melted chocolate. Then the stick holder is tilted, by means of a cam that raises one end of the bracket, so that excess chocolate will quickly drain off each novelty.

At the discharge end of the dipping-drying cycle, novelties are automatically released from the stick holder and drop into a 24-compartment positioning conveyor. This unit then deposits them in rows on the wrapping machine feed belt. The empty stick holder is later removed from the revolving conveyor and sent back to the stick placer at the in-end of the brine tanks.

Procedure for manufacture of creamsicles, fudgesicles and ice pops is similar except that the chocolate coating is omitted from products of this type.

The Wrapping Operation

As previously stated, the novelties which are deposited on the short, constant-speed belt are subsequently transferred to the wrapping machine feed conveyor. In the meantime, wrapping material is taken from a preprinted roll and trained through the feed section and forming box of the wrapper where it is formed around the product and into a continuous tube.

Sealing of the tube is accomplished by a floating heat-sealing shoe, as it is continuously conveyed on two vertical tubing belts. The product is kept in register with the printed copy on the wrapper by photo-electric equipment.

The tubing belt draws the finished product-containing tube into the cutting and crimping section where individual packages are cut off, and the ends crimped and heat-sealed. Wrapped and sealed novelties are then delivered on a conveyor for packing into sales units.

Five girls are needed to keep each wrapping machine in operation. One is required to start and stop it, to make sure products are fed correctly, and make the adjustments necessary to insure complete wrapping and proper machine speed.

Another girl makes up packing cartons, and two girls pack the finished items into them. Filled cartons move to the final operator who closes and tapes them, then bales them into 6-carton units.

Taped bales are conveyed to an elevator that raises them almost to the ceiling, then feeds them onto a stainless-steel-enclosed belt conveyor which moves them directly into the refrigerated storage room without interfering with operations in the novelty room.

Because of the scarcity of wrapping materials, changing shapes and sizes of products, and new and varied labeling requirements, this operation has not progressed to the point where it is possible to establish the rate of efficiency at which all of the productive and packaging equipment should operate. As an example, it recently developed that the use of certain wrapping materials would enable printing during the operations. Since a wide variety of flavors are packaged, it was formerly necessary to change rolls a number of times daily.

This imprinting permits the use of stock wrapping paper containing only the Breyer trade-mark. Additional printing is now done by a rubber type rotary imprinter. This alone has effected a saving of at least 15 min. per day, which represents an increase in efficiency of approximately three percent.

Another important saving resulting from the new operation is in time formerly required to change from one novelty to another in order to maintain a balanced inventory of the six different items made.

Since sale of stick novelties is very erratic—being particularly susceptible to variations in summer temperatures — manufacture must be practically current with sales volume. It therefore follows that the production schedule must be set up so as to make more than one item on each working day. Otherwise, excessive inventories would be built up on some items while those on others would be inadequate.

With the original, single-line setups, shut downs were required several times daily to make necessary change-overs. Now, two items are run concurrently and, when additional change-overs are needed, they are made during the lunch hour, thus entirely eliminating the time formerly lost.

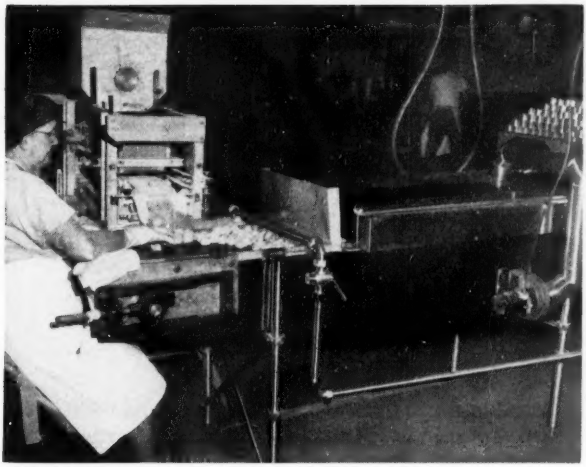
In addition to the above mentioned advantages resulting from the change in the novelty manufacturing and packaging operation, the company has discovered the following additional benefits:

1. The new wrapper extends full sanitary protection, previously afforded only in packaged ice cream, to its full line of products.

2. Consumer acceptance of novelties has increased due to the neat appearance of these packages.

3. Dieticians and institutional buyers are showing a marked preference for products in the new wrap.

4. The crimped ends provide, within the packing carton, a cushion that protects the products during in-plant handling and transportation, to the point of sale.



COMING from forming machine (left), flour-coated meat balls feed to conveyors going to infra-red broiler (right) at Nu-Trishus Corp. plant. Pipe sprays grease on meat balls going into continuous cooker.

EMERGING from cooker (left), uniformly browned, cooked meat balls are hand-filled into cans that are then sealed.

New Infra-Red Broilers Make Meat Balls Better

Using efficient continuous broilers, each with battery of heat-ray tubes, two companies now are turning out more uniformly browned products at a saving

RAY BLOOMBERG
Food Engineering Correspondent, Seattle, Wash.

Savings in labor costs, reduction in product waste and more uniform browning of meat balls are the major benefits attained by Nu-Trishus Products Corp., Chicago, and Bergoust-Wilson Co., Seattle, through the use of infra-red broilers. Until these broilers were developed, no cooking equipment was available which would give the meat balls the desired golden-brown finish.

Previously a crew of women cooked the product on gas-fired ranges. With this method, not only was it difficult to cook the meat uniformly, but many of the balls broke during cooking and were unsuitable for canning. What's more, heat and grease created by the batch system made working conditions disagreeable.

The Chicago unit consists of a conveyorized, stainless steel, electric broiler, which is 20 ft. long and has three sections. A section contains two sets of twenty 750-watt heaters, each set being individually controlled to adjust the cooking temperature. Warm air above three parallel 8-in. slat, cooker conveyors is fed to the undersides of the conveyor by exhaust blowers to assure uniform cooking of the meat at 400-500 deg. F.

Known as the Merco Heat Ray tube, the heating element consists of a nichrome resistance wire which is coated with silicon cement that expands and contracts with the metal. The wire is enclosed in a 25-mm. Pyrex glass tube ranging in length from 23 to 47 in. This tube emits a multiple-frequency ray in short and long infra-red wave lengths (3½-7 microns), and it provides uniform distribution of heat. Wave length of the radiation can be adjusted by varying the temperature of the element. The tube is guaranteed for one year, and it costs $6.00-$7.50.

Although the heaters provide a high concentration of energy, the glass surface of the tubes remains relatively cool. Thus, burning of grease in contact with the tubes is prevented and cleaning at the end of the day is faster and easier.

Only one girl is required to feed the automatically formed meat balls onto the broiler's three conveyors. This girl now releases for other assignments three workers formerly needed in the batch-cooking process.

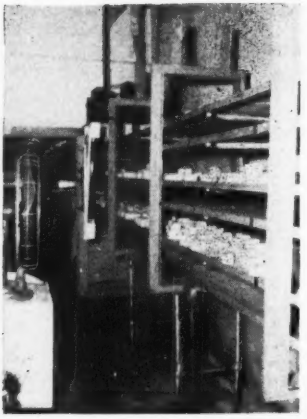
New Method Raises Output

Since this unit was installed, production has increased from 6,000 lb. in 8 hr. to 9,000 lb. in 7 hr. What's more, working conditions are better because the area is free of unpleasant fumes and is cooler than when the conventional gas-broiling system was employed.

The Seattle infra-red cookers, designed by John C. Wilson, of Bergoust-Wilson Co., and Judson M. Coats, of Merco Industries, also is constructed in sections. It is 16 ft. long and 15 in. wide. A conveyor carries the meat balls from the forming machine through a 12-ft. cooking section beneath a battery of seventy-two 750-watt Merco tubes. The unit carries a connected electric load of 45 kw., and it is operated by a ½-hp. motor.

Cooking in this broiler takes 4 min., and production amounts to 400 cases per 8-hr. day. The cost of electric heating, in an area where rates are relatively low, is less than the fuel cost for the former gas-fired ranges. Also, the new unit saves the labor of five workers and eliminates a former 5-7 percent loss due to breakage of the meat balls during the cooking operation.

1 LOAVES OF BABY EDAM are wiped free of surface moisture and placed on stainless conveyor that moves them to cooling and drying room.



2 ADDITIONAL MOISTURE is removed on a triple-tiered conveyor.

Cheese-Coating Goes Continuous

Important economies are demonstrated on cheese line by new quick-coater. And its flexibility is seen making this type of protection feasible for other foods

LLOYD E. SLATER
Assistant Editor, "Food Engineering"

The belt-line coating technic, employed so successfully in the confectionery field, is now being adopted with similar striking benefits in the cheese industry.

For J. W. Greer's new wax coating machine—an offshoot of the company's pioneer line of continuous chocolate enrobers—has demonstrated a flexibility that can make the application of protective coatings an inexpensive, simple step in many types of food processing.

First experimental model of the machine went to the Mayville, Wis., plant of Purity Cheese Co. to cope with an urgent call for increased waxing capacity. And it quickly proved itself—turning out three times the old peak volume set by four hand dippers. In addition, there were these beneficial "extras" resulting from the new technic—

- **Greater wax economy**
- **Improved wax-coat uniformity**
- **Reduction in reject coatings, and**
- **Adaptability to many products.**

In fact, all the quality and quantity boosts that usually result when a batch procedure goes successfully continuous blessed the Purity operation. So it wasn't long before a second Greer machine was obtained to form a parallel line, thus achieving double-barreled efficiency.

Machine waxing was the clue to a truly continuous cheese line at this plant. For the old hand dipping methods, entailing considerable delay in cheese movement, could at best only provide spurt batches to a waiting line of girl packers. Each cheese had to be dipped from both ends with a wax-hardening interval between.

How Line Operates

Today's line starts with two girls unloading from a large tray of precut cheeses wheeled in from the processing area. Cheeses are wiped free of surface moisture, then placed, in four travelling columns, on a stainless steel moving belt. They are thus conveyed into an isolated room, to travel through three tier levels of belt for 25 min. of forced-air cooling and drying.

Leaving the drying room, the cheeses are next placed two abreast on the feed-in belt of the new waxing machine. Passage through the unit takes less than 1 min. At discharge, coated cheeses move from the machine onto a Neoprene belt where streams of cool water help set the wax. At this point they may be removed for a second coating, or continue to packaging.

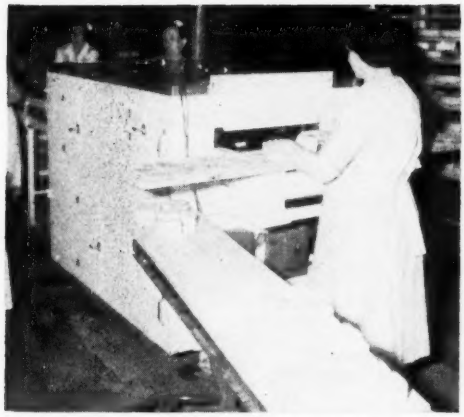
When two waxing machines are going at full capacity, 22 girls are kept busy wrapping the product in cellophane. Wrapped cheeses are placed back on the belt and proceed to the end of the line for boxing and weighing. Boxes are then placed in cartons for palletizing.

Capacity of the new system was demonstrated by a check of a typical day's run—starting at 7 A.M. and ending at 4 P.M. During this time, five batches of 8-oz. Goudas and almost three batches of 8-oz. baby Edam loaves were run—with about 1,300 cheeses per batch. And while the Goudas only required a single coating, each baby Edam received two layers of wax.

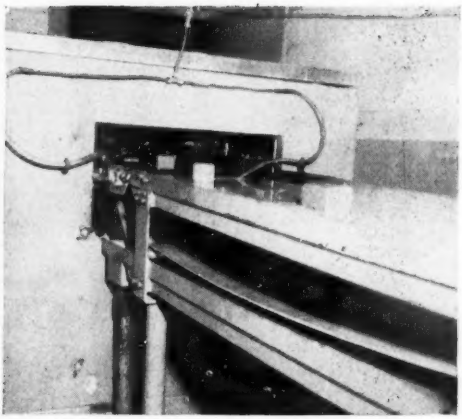
Other types of cheese travel equally fast through the process. Some of these are 1-lb. LeRoi, 8-oz. wedges, 4-oz. wedges, and 11-oz. Goudas.

Essentially, the coating machine simply involves belt conveying cheeses through melted wax. But many variables complicate what might seem a simple operation. Ingenious features in the machine—to make continuous coating trouble-free—are revealed on closer inspection.

Following a 10-lb. bar of wax through melting and onto the cheese will best illustrate: Four bars can be placed in the two electrically heated, thermostatically controlled, melting



3 **CHEESES** from drying room are placed on mesh conveyor at feed-in of wax-coating machine.



4 **AT DISCHARGE END,** streams of cool water play on conveyor to quickly harden wax-coating.

5 **INDIVIDUAL CHEESES** are weighed, wrapped in cellophane, boxed and, finally, cartoned for shipment.

6 **SLICING** permits wax to be peeled off, leaving rindless, natural cheese. Note neatly wrapped units.

compartments atop the machine. These compartments are maintained at about 130 deg. F. to provide a slow, steady supply of fresh wax to the process.

Liquid wax continuously drains from each melting chamber through a pipe into a jacketed storage tank in the base of the machine. Thermostatically controlled warm water, circulating in the jacket of this tank, maintains the liquid wax at an exact pre-set temperature—red wax is held at 145 deg. F., yellow wax slightly higher.

It may be noted that in the latest Greer model this warm water has been replaced by oil, which provides a better heat transfer and eliminates the problem of evaporation.

From the storage tank, wax is continuously circulated by pumps up through pipes into two coating pans. Hand valves allow an adjustment of wax flow to both the pans and to a flat surface at the exit of the machine, where a bottom coating is applied.

A stainless steel meshed belt carries the product through the waxer. This conveyer dips each cheese into both tanks before moving on over the bottoming section. This double-dip effectively eliminates one of the biggest problems of continuous wax coating. Melted coating is bubbly and a single dip results in air being incorporated in the coat. But this fault is eliminated by moving the cheese out of its first dip into the air for partial hardening, and then redipping.

An important element in the success of the new continuous technic is the wax itself. Ordinary paraffin wax and even regular manual cheese-dipping wax proved unsatisfactory for machine use. Accordingly, a special blend of eight or nine different waxes was devised for the operation by an expert from National Wax Co., who studied the problem for a few days at the plant. The resulting thermoplastic type wax, now in use, combines the proper adhering qualities with a good tear-resistant texture.

Perhaps the most intriguing thing about the new wax coating machine is its versatility. It is able, through minor adjustments, to wax coat objects of varying sizes and shapes—through machine features providing control of these four factors:

1. Temperature in wax melting pan
2. Temperature of circulating wax
3. Flow of wax to coating pan and bottomer, and
4. Speed of product-conveying belt.

Other items experimentally coated by the unit have been dill pickles and corn-on-the-cob for freezing. And many further applications are now under investigation.

LINE of Duncan Hines foods includes variety of shelf items packed in glass, all bearing family label.

Operation Quality: It Shows How

Spearheaded by a superior ice cream, new "Duncan Hines" line of A-1 shelf products finds volume acceptance at premium prices . . . Reports from all sections prove that "many will pay if you give them the best"

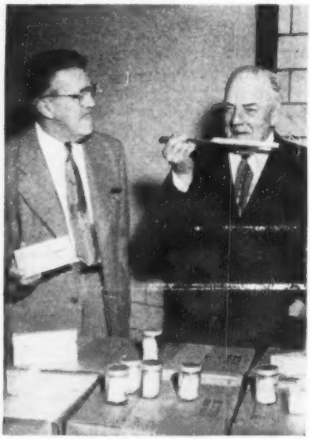
ROY PARK and IVAN C. MILLER
President, Hines-Park Foods, Inc., Ithaca, N. Y., and Assistant Editor, "Food Engineering," respectively

Supreme quality foods do command premium prices. That fact has been established by the experience of Hines-Park Foods, Inc., which franchises the brand name "Duncan Hines".

Organized to build a national market for grocery shelf foods that had already won recognition for quality in local areas, this company chose the brand name "Duncan Hines". This selection was based on the contention that Duncan Hines was widely known as a food connoisseur and therefore foods branded with the name would be associated with the best in quality, and would command immediate market acceptance at commensurate prices.

To test the feasibility of the plan, recognition studies were conducted. These indicated to what extent the name "Duncan Hines" was known, and also what association was attached to the name. After that, nine Duncan Hines labeled shelf-items were offered for sale in local test markets. With assurance from both the studies and market tests, the company started franchising in June 1949.

Before the grocery-shelf type of foods began making headway, Glen Boger, president of Lehigh Valley Dairy, Allentown, Pa., and a personal friend of those heading the new organization, made a fortunate suggestion.



DUNCAN HINES personally samples butter. President Christians, of Christians franchise company, looks on.

It was his viewpoint that if ice cream of finest quality were manufactured locally under formula and brand-name franchise, distribution could quickly be extended nationally. He figured that national acceptance of a quality brand of ice cream would accelerate market acceptance of all items in the line, and spearhead distribution.

Boger's plan provided two stipulations: (1) Local franchise should be granted only to those ice cream manufacturers who had adequate plant facilities and who also had a record of producing high quality ice cream. (2) Ice cream marketed under "Duncan Hines" label must be processed by specified method exactly to formula.

Formula and processing specifications were developed jointly by Lehigh Valley, Duncan Hines, and staff of Hines-Park Foods. The new product was first marketed in April 1950. One year later, 82 companies franchised in 40 states (see map) were making and distributing Duncan Hines ice cream.

Pioneer in marketing ice cream under the new label was Lehigh Valley Dairy. It reports that at the end of the first six months, the new brand accounted for 20 percent of the company's packaged ice cream sales, with no loss in sales of the dairy's own brand. In the dairy's marketing area

CHEESE, butter, margarine, frozen foods, and other semi-perishables, are also marketed under the brand name.

Better Foods Will Win a Widespread Market

Duncan Hines ice cream sells for 70 percent above the company's own brand. Nevertheless, all retail outlets selling the company's own brand, also carry the Duncan Hines brand. One of the dairy's chain-store customers reports that 25 percent of the store's ice cream sales are Duncan Hines.

A franchised company in Texas says that, though competitive prices range as low as two pints for 25c. in large self-service outlet, while Duncan Hines brand sells for 50c. a single pint everywhere in this market, "never have we placed Duncan Hines ice cream where the public can pick it up, that it has not sold". Chains and supermarkets that formerly hadn't carried the company's own brand, now carry both. The company comments further: "We average from 10 to 20 calls per day from those trying to locate Duncan Hines dealers."

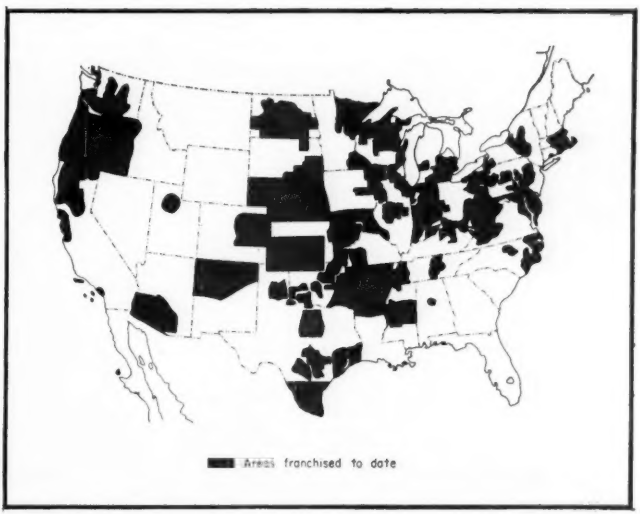
In Indiana, a franchised manufacturer lamented that no progress had been made selling the company's own brand to supermarkets and large chains. Yet, even though priced well above all competitive ice creams, the franchise brand met little sales resistance from these same outlets. Fifty-seven new accounts were opened within two months. And, in a very short time most of these stores were also selling the company's own brand.

Prolonged labor strikes in one area had created a local depression. But in spite of the hard times, ice cream sales of a franchised company climbed 30 percent, and this with only a slight decrease in company-brand sales.

"We do not feel that our regular product has suffered by comparison (with Duncan Hines brand). Rather, we believe, the new product has added prestige. Repeat business is very good. Sales of Duncan Hines brand in some spots is running ahead of our regular brand. Half of the Duncan Hines volume represents a sales increase. And, surprisingly, this premium product is just as salable in low income areas as in the more prosperous neighborhoods". This is the statement of a Missouri franchised manufacturer.

From Colorado: "Increase in sales has been substantial, and directly traceable to Duncan Hines promotion. More than 50 percent of our packaged volume is now Duncan Hines brand". This company's own premium brand was discontinued in favor of the new brand. In the short time of the franchise, sales of the product have climbed

Eighty-Plant Coast-to-Coast Distribution



NEW DEPARTURE in labeling practice places quality responsibility on both distributor and manufacturer, whose name and address are also on label.

to three times that of the former premium brand. The new product sells equally well in low and high income districts. Also, increased sales of the company's other dairy products are credited to the market influence of the new ice cream.

Most franchise holders report increases in packaged ice cream sales from 20 to 50 percent, with little if any loss of volume of the company's own brands. As stated, some credit the boosted sales of their own products to the prestige of the new companion ice cream.

There is reason to believe that this almost national acceptance of Duncan Hines ice cream is paving the way to national marketing of the grocery-shelf items labeled with the same brand name.

Building national distribution for grocery-shelf items requires methods differing from those used to obtain widespread sales of ice cream. National distribution of ice cream depends on intensive development of each local area by the sales force of each franchised manufacturer. In the absence of a huge national sales organization, distribution of grocery-shelf items must rest with brokers and jobbers.

Structure of Hines-Park Foods does not exclude manufacturers of foods now enjoying complete national distribution. However, it offers greatest advantages to those companies which, though they may have won regional acceptance, have not yet achieved national distribution. There is provided a correlative service with brokers. Selection of brokers, however, is the privilege of the licensee.

How Distribution Is Obtained

Franchise for Duncan Hines baked beans may be granted to a Maine canner who has a broker in Boston but, say, none in Chicago. The Boston broker is offered the Duncan Hines baked beans. Representing the company with this line, he may be offered also the Duncan Hines pickles, processed in Illinois, by a franchised processor with no representation in Boston. He may also be offered other items, if they do not conflict with types of foods he already sells. If, for any reason, the Boston broker cannot take on an item, Hines-Park Foods then secures an alternate broker in the area, subject to the approval of the licensee.

Reports on market acceptance for grocery-shelf items are similar to those of ice cream manufacturers. A supplier in the Midwest comments as follows:

"We delivered 1,000 cases of Duncan Hines dressings (for salads) to one of the chain organizations in this area. The time was the end of October, 1950. Since then we have sent additional orders at the rate of two a month to this same organization. Total number of cases reached 8,000 by May 1951.

"Our volume of orders is remarkable for two reasons: First off, it may be noted that at the time the dressings were placed in the store, there were

These Are New Specials Added to Line

CITRUS-FRUIT gift box assortment can be ordered by mail.

DANISH COOKIE pack bids for country-wide popularity.

ICE CREAM sales are mostly in pints. Special uniform containers have been adopted to promote brand identity in all markets.

already 95 rows of dressings of all brands, types and sizes on the shelves. Many of them were brands which have been advertised nationally for years, whereas no advertising or special displays helped to sell the new-comer. High sales in the face of so many competing items may well be considered unusual.

"Second, when it is realized that the Duncan Hines dressings were priced above all others, the quantity of sales is even more remarkable."

A report on the acceptance for Duncan Hines coffee states: "Despite the fact that it was priced 4c. above the highest priced brand on the shelves of a large chain store, by the end of the first week, the chain clocked it as the second best seller."

Policing for Quality

No matter how compelling the brand name of a food, or how forceful the merchandising, sales volume cannot be maintained if quality varies. Every food manufacturer who enjoys stable market acceptance knows this fact from experience. He therefore jealously guards the quality of his product and strives for maximum uniformity.

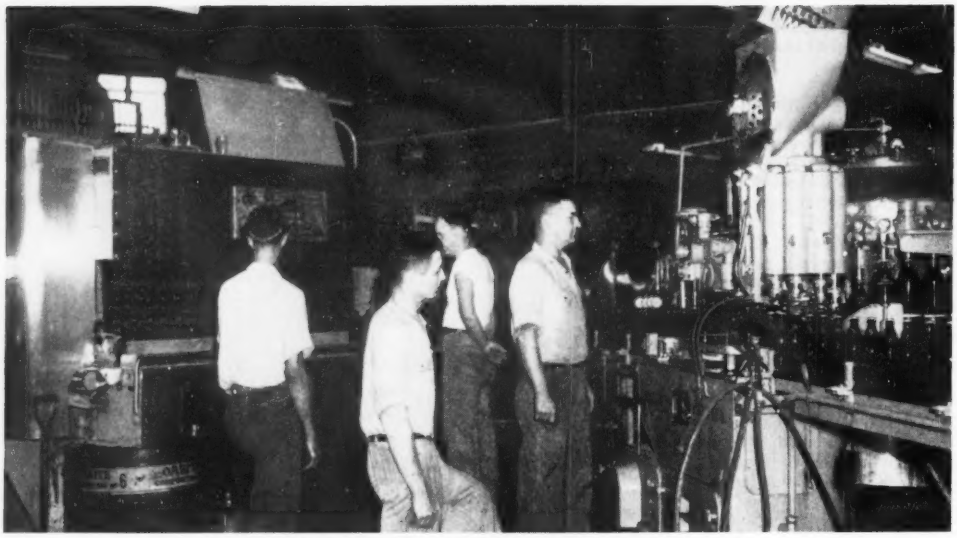
Protecting the quality and uniformity of one's own product is one thing. Maintaining the quality of products made in the plants of a hundred different companies is quite another. The continued success in building a national market for premium quality foods, marketed under the Duncan Hines brand name, depends more on policing the quality than on the initial national acceptance inspired by the name.

The central quality control laboratory is at company headquarters in Ithaca, N. Y. Another laboratory is in the Midwest, and others will be located regionally as required. When an application for a franchise is received, the plant of the applicant is inspected for facilities and sanitation. Taste panel and laboratory tests determine the quality of the product. This testing is done regardless of the market acceptance the food already enjoys.

If both product quality and plant conditions are deemed satisfactory, a franchise is granted. This does not end policing of either plant or product. It is but the beginning.

In the areas in which company products are marketed, a field staff collects samples from retail outlets. These may be sent to one of the company laboratories or, when expedient, to a local

(*Turn to page* 184)



"Reliefers" Take Over at Washer, Filler . . . Special Work of These Men Is Eminent in Giving Ortlieb—

CONTINUOUS TOP OUTPUT In Spic-and-Span Plant

Schedule is kept at capacity, shipping time cut, sanitation boosted by Philadelphia brewery's versatile "platoon system"

F. W. McCARTHY
Assistant Editor, "Food Engineering"

Uninterrupted capacity production in a plant constantly kept clean—in short, quantity with protected quality —is the achievement on the bottling floor of the Henry F. Ortlieb brewery in Philadelphia.

■ **The "Reliefers"—special workers developed by the foresighted brewery's management—do the trick.**

The bottling department, located on the second floor of a postwar, three-story, steel frame and masonry building, is made up of two straight-line production assemblies. Each line has a capacity of 15,000 bottles per hour. And these are the major pieces of equipment: Meyer Dumore bottle washer, Cemco filler, Meyer-Cataract pasteurizer, Ermold labelers, and Standard-Knapp casers.

The special relief crew is assigned by Superintendent George Leonhardt to report to work 2½ hr. later than the regular men. Made up of six workers who are familiar with the entire set up, this crew fills in for the regular men during their rest and lunch periods. The crew also "doubles" for the men on the shipping floor, directly below, eliminating any lost time or waiting by truckers.

Then, at the end of the day's run, these men immediately start clean-up operations as fast as each unit closes down. And, being familiar with the various components, they do a thorough cleansing job with a minimum of lost time and motion.

Role played by this crew can best be visualized by describing how the department operates.

The first regular-crew man to report to work is the filling operator. Arriving at 6 A. M., he first flushes out the fillers and lines, prior to the day's run. The system, when not in operation during the night, is kept filled with Diversol solution.

Use of this agent keeps the system sterile and eliminates the necessity of knocking down the units for cleaning overnight, thus assuring sanitary lines and equipment at the start of the following day's run.

Other members of the regular crew, coming in at 7 A. M., bring the pasteurizer up to operating temperature. Here, there has been an interesting innovation. A Minneapolis-Honeywell aquastat has been hooked to the motor driving the bottle-moving parts of the pasteurizer.

Human Error Barred

This instrument, set at the right temperature for processing, prevents the starting switch on the pasteurizer motor from functioning until this heat has been reached. Thus, it is impossible for any bottles of beer to pass through the unit without the temperature condition being satisfactory. And, the possible human error of forgetting to turn on the steam lines to the pasteurizer is prevented.

There is also further protection against the chance of the unit operating in the event of the steam supply failing. For, when the temperature in the pasteurizer falls below that required, the aquastat immediately stops the machine. A flashing red light mounted above the entrance end of the pasteurizer notifies the operator the moment that movement through the unit stops.

■ **Thus Ortlieb is assured that every bottle of beer coming out of the plant has been properly pasteurized.**

Filling machines are started at 7:40 A.M. and the casing crew comes on duty at 8:30 the interval between allowing time for a quantity of beer to pass through the pasteurizer. Then, at 9:30 A. M., the special relief crew reports. By this time, the bottling lines are in high gear. The "Reliefers," on arrival, "spell" the regular operators for their rest period or "beer-time". In this manner, the production lines are kept running at full capacity. Then when the "regulars" come back, this crew goes to the floor below to take over for the shipping floor men.

Shipping Details Engineered

Having this crew fill in on the shipping platform is highly important. In this way, there is no lost time in truck loading or unloading at this brewery.

A well engineered and efficient materials handling system, comprised of Alvey roller and belt conveyors, electric eyes, automatic switches, and other devices, supplies filled cases to the truckers at the loading docks as fast as the truckers can load their respective trucks—and in some instances faster.

Extending sections of roller conveyors fit inside the trucks, to reduce the actual manual handling to an absolute minimum. So loading time is strikingly short. The same moving equipment runs in the opposite direction to unload the trucks. Any lost time by a trucker on the loading dock of this brewery is entirely that of his own making.

Spray vs. "Visitors"

Here again, Ortlieb has an interesting innovation. Returning empties frequently carry "small unwelcome visitors"—the various insects food plants strive to do without. The best way to rid the plant of them is to greet them with a lethal weapon. Here's how they are received at Ortlieb's:

A unique electro-mechanical device has been installed that automatically sprays each case with a solution of chlordane.

Cases of empties first travel to the washer via roller conveyor. After the bottles are transferred to the bottle-washer shelf, the empty case continues on the conveyor to the packaging end of the line.

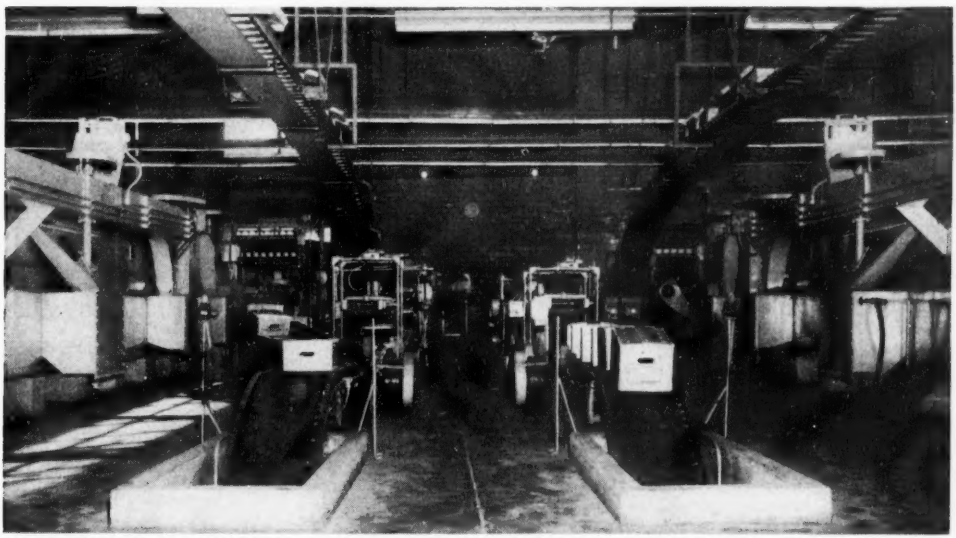
Within a distance of less than 10 ft. from the point where the bottles are removed from the case is the automatically operated insecticide sprayer. This unit is fitted with two actuating fingers that operated a solenoid valve hooked to the air line on the washer. The first finger opens the valve to release insecticide from a small cylinder. The nozzle of the sprayer is located directly above and is aimed to "cover" each passing open box. The cases receive a thorough blast of insecticide. The second finger (case-contact operated) actuates the same solenoid valve to shut off the air supply.

Since this unit was installed, insects have been eliminated from the bottling floor. Further, it has been found that the spray is effective for a period of approximately four weeks and has been a strong factor in repelling insects—keeping them from coming in contact with the case in establishments outside the brewery. Thus the unit has also been highly effective in reducing the number of insects which would normally come to the brewery.

Clean-Up Procedure

At the end of the day, the relief crew begins its clean-up work at the feed end of the soaker. This is the first unit to be shut down, hence is logically the initial unit to be cleaned. From this machine, the crew follows through with each successive piece of equipment. And so the risk of any debris or dirt accumulating to cause future trouble is nipped in the bud. The brewery's policy is "Keep it clean always—as soon as it shuts down, clean it."

Every machine receives a hot water wash at the end of each day. The entire floor, too. And each week, the



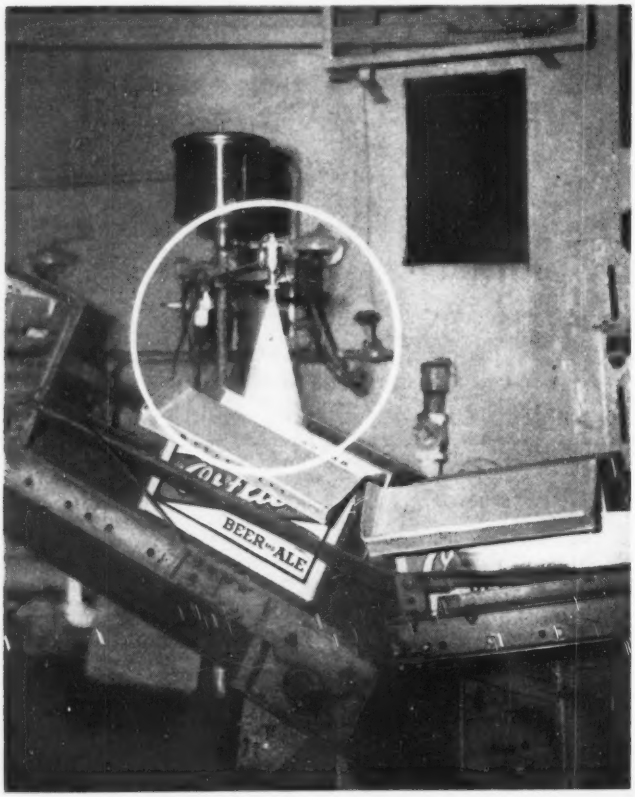
SQUAD'S clean-up work is made remarkably easy by roomy layout of lines. Seen above are bottling units (at sides), case lines (center). Empty cases travel overhead, parallel with bottles, to casers in rear. Filled cases go on belts (foreground) to shipping floor below. Note electric-eye counters alongside belts.

floor also receives a mop wash in which "Actex" is used.

Finally, a word about the cleaner and oiler, who come on at 2:30 P. M. Their first task is to make a general review of the operation. Then, if there are no special jobs, they start immediately on pre-cleansing work, such as emptying drums of broken glass, stacking and removing cardboard case spacers, and other miscellaneous jobs. This permits the relief crew to start their overall cleansing and washing operations immediately at the end of the day's run.

The two men are well versed in the cleaning and lubrication of each machine. As the various units close down, the cleaning operator goes to work at once on the particular machine. He starts with the soaking tanks, removing labels and other solids from these units.

This operator also follows a fixed schedule of steam cleaning each machine. Taps in the plant steam lines provide access for the cleaning hose. Penetone "Senior", a liquid agent, is used in these cleaning operations.



Each Unit Scheduled

Certain pieces of equipment are steam cleaned each night, the schedule being worked out so that every unit receives this cleansing within a fixed period. Each pasteurizer is thoroughly gone over once a week.

The second man of this two-man team—the oiler—follows after the cleaner and thoroughly lubricates each machine. Upon completion of the washing operations, the cleaning man fills the lines, including the fillers, with Diversol so that they are in a completely sterile state during the idle night period and at the start of the next day's run.

←

Spray Promotes Sanitation

EACH case, as it passes under nozzle, (see circle) is automatically fumigated with insecticide, effective for weeks.

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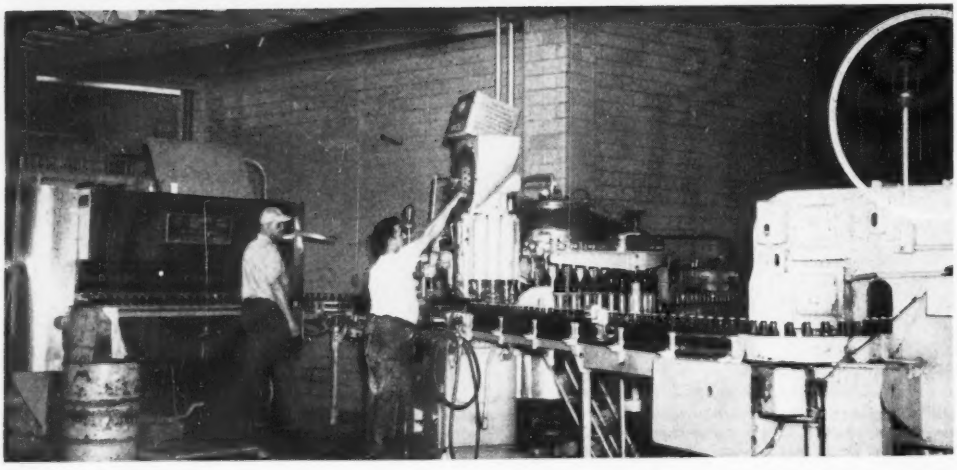
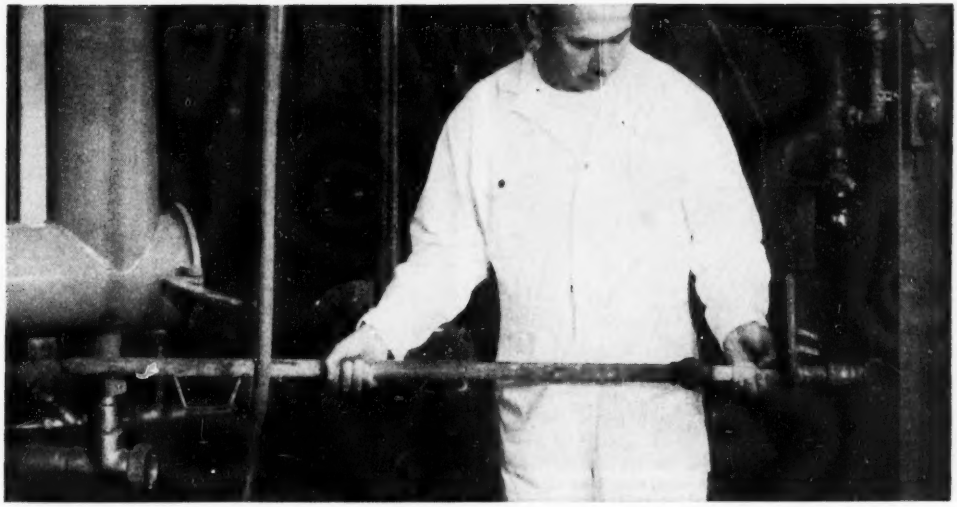
Red Light "Watches" Quality

AT ENTRANCE to pasteurizer, red bulb (circle) flashes when aquastat stops movement of bottles through pasteurizer.





SHOP-MADE UNIT is handy tool comprising ¾-in. pipe with steam ejector (bulb-like device), and hand-hold cover.

It Cleans Evaporator Tubes Faster

Dairy's clever device quickly removes formerly-obstinate burn-on from steam-chest piping, also film from pan . . . Materials and labor saved

GEORGE SMITH
Powder Plant Superintendent,
Danish Creamery Assn., Fresno, Calif.

More efficient cleaning of vacuum pans, plus a saving in both material and labor, have been achieved at Danish Creamery Assn., Fresno, Calif., by use of a steam muffler and a mild alkali solution.

The vacuum pans are used to concentrate skim milk to 40 percent solids as the first step in the manufacture of Grade A powder. In this operation, a film of milk is burned on the tubes of the steam chest; also, a much lighter film adheres to the inside surfaces of the pans.

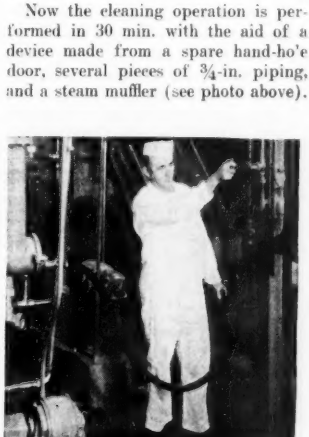
Had to Have Extra Brushing

This light film in the pan created no serious sanitizing problem. But to remove the burned-on film from the tubes, an alkali solution (35 lb. alkali in 200 gal. water) had to be preheated, then boiled (under 15-in. vacuum at 180 deg. F.) through the unit for a period of 1 hr.

This method of cleaning at the end of each day's operation resulted in a still further burning-on of the milk film, and the tubes had to be additionally cleaned by brushing. This "tube-punching" took one man 4 hr., or a total of 8 hr. for the two units.

New Way Devised

Now the cleaning operation is performed in 30 min. with the aid of a device made from a spare hand-hole door, several pieces of ¾-in. piping, and a steam muffler (see photo above).



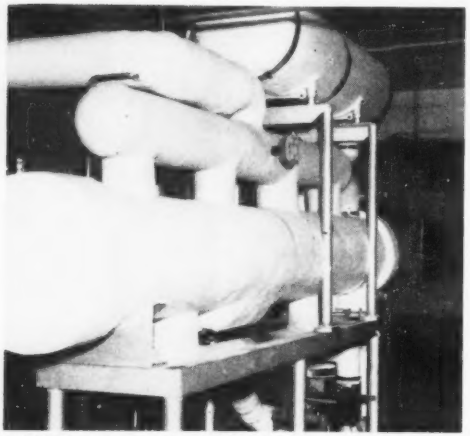
IN ACTION. Unit is seen installed and connected to steam line. When valve is opened, solution boils and circulates through tube bundles.

These were assembled in such a way that, when the door is placed on the vacuum unit, the muffler falls directly under the tube-bundle of the steam chest. A reducer was placed on the ¾ in. pipe to facilitate connection of hose from the plant steam line.

In operation, the device is attached to the pan to be cleaned, a solution (2½ lb. alkali in 60-gal. water) is added to the unit, and a vacuum of 12 to 14 in. is established. Live steam at 345 deg. F. is then ejected into the solution, causing it to boil and circulate through the tubes and into the pan. The solution is then drawn into the Penberthy heater, reheated by the steam, and ejected into the steam chest, to be recirculated through the unit. Condensate added from the heating-steam is not sufficient to dilute the solution since, simultaneously, some of it is being evaporated.

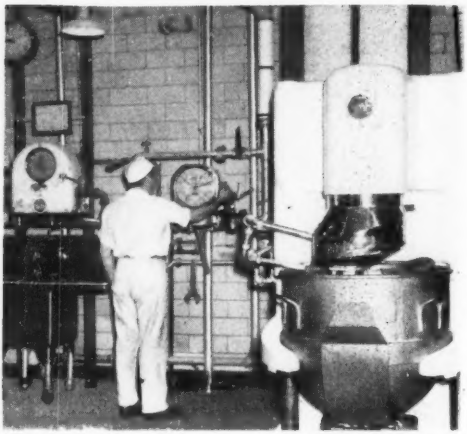
Because this method eliminated the need for bringing up the temperature in the steam chest, there is no secondary burning-on of the milk film. Also, it so thoroughly cleans the tubes that there is no need for "tube-punching." The daily saving in materials amounts to $7.80, and in labor approximately one man-day.

Liquid Sugar Is First Chilled . . .



PASSING through Flo-Sweet designed heat-exchanger, liquid sugar is cooled to 50 deg. F., then delivered to mixers.

Then Metered Into Process



METER is being set by operator to feed chilled liquid sugar into Glen mixer where batter is premixed for 2 min.

Two New Processes Engineered to Produce

BETTER QUALITY CAKES

Drake now gets more uniform products by automatically handling and prechilling liquid sugar, and then continuously mixing and feeding batters to depositor. Operations also raise efficiency

R. D. WARD and A. G. HACKETT

President and Director of Production Control, respectively, Drake Bakeries, Inc., Brooklyn, N. Y.

Two dividend-paying innovations have enabled Drake Bakeries to increase production efficiency and to improve product quality. These innovations are:

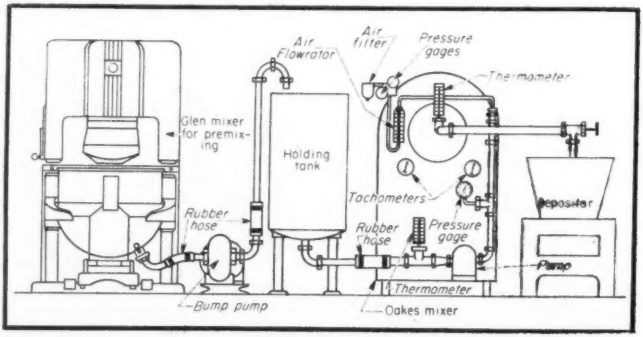
- **A Flo-Sweet liquid sugar cooling and recirculating system for controlling the temperature of cake batters.**
- **An AMF Oakes mixer for continuous production of better cakes faster and with greater output per worker per hour.**

The scheme for automatic handling and prechilling of liquid sugar pays in more ways than one. First, there is a price differential in favor of the liquid over bulk sugar. Then mechanical delivery of liquid sugar to mixers by pumping and metering has brought about marked economies in labor.

Moreover, this liquid sugar handling technic has provided additional floor space for storing other materials. Also, there is no cluttering in the mixing rooms of our Brooklyn plant—as was entailed by stacked sugar bags.

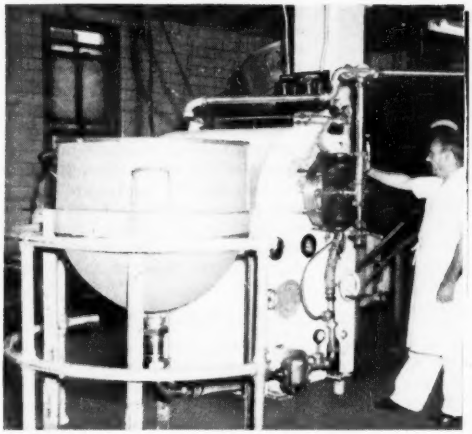
For the first time in any cake bakery, prechilling and circulating of one of the principal ingredients, liquid sugar, permits better control of the temperature of batters—thus assuring cakes of more uniform quality.

Formerly, the mixing and temperature factors were difficult hurdles control-wise in the preparation of batters. And cakes made from batters that were not in the 65 to 70-deg. F. range often had less volume, tighter texture and hollow bottoms.



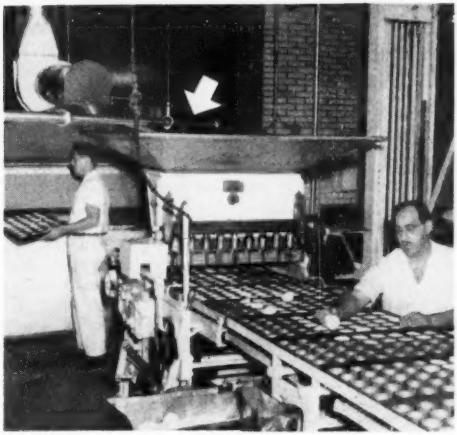
BATTERS are premixed, pumped into holding tank that feeds Oakes continuous mixer, and then piped directly to the cake depositor.

From Continuous Mixer . . .



AMF OAKES continuous mixer (center) prepares 2,000 lb. batter per hour. Tank (left) feeds pre-mix to mixer.

Batter Is Piped To Depositor



PIPE (arrow) delivers uniform flow of batter to depositor. Cup-cake batter is then deposited into cups. Baking follows.

Facilities were not available for pre-chilling the major ingredients, flour and sugar, before mixing them.

Frozen eggs and water, the minor ingredients, provided some refrigeration when introduced into mixers. But the main trouble with them was controlling their temperatures. Often, eggs had to be defrosted to various degrees in order to make up for any differences in the temperature of the water. If, for instance, the water got above 60 deg. F., as it sometimes did in the summer months, then the eggs had to be tempered to a lower temperature.

Eggs containing ice crystals did not reconstitute properly. And poorly reconstituted eggs resulted in less stable cake batters that subsequently produced products of non-uniform quality.

Ideal conditions for preparing cake batters are to chill all ingredients to 70 deg. F. and to air-condition the mixing room at the same temperature.

"How" of Prechilling

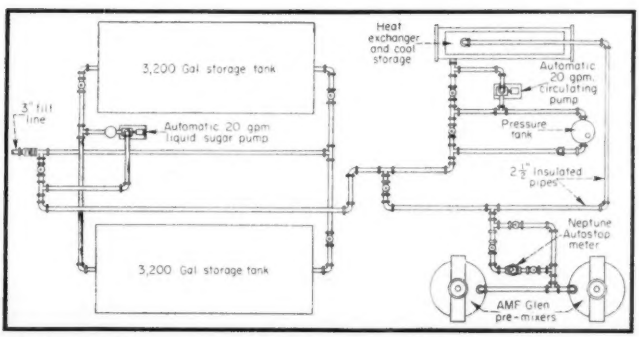
Liquid sugar, custom blended to Drake's specifications, is delivered from the Yonkers, N. Y., plant of Refined Syrups & Sugars, Inc., in 2,600-gal. trucks. From the trucks, the liquid sugar is pumped into two 3,200-gal., plastic-lined metal tanks.

Two measures are taken to keep the liquid sugar sterile during storage:

Germicidal lamps have been installed inside the tanks, directly above the level of the liquid sugar.

A fan in each tank circulates air through vents, thus eliminating moisture condensation and spoilage.

Hooked up to each tank is a solenoid float valve that sets off an alarm when the liquid sugar approaches the empty mark. And when one tank is empty, an attendant immediately switches the other tank on to the line.



DRAKE'S SYSTEM for storing, chilling, recirculating and metering liquid sugar into premixers is seen in this plan drawing.

From the basement-located storage tanks, liquid sugar is pumped five stories through a 3-in. dia. pipe into an asbestos-insulated tubular heat-exchanger with 105 sq. ft. of cooling area. Temperature of the liquid sugar is lowered from about 85 to 50 deg. F. in one pass through the heat-exchanger. Freon is the refrigerant employed in the cooling system. And the rate of syrup flow through the unit is 20 gpm.

Leaving the heat-exchanger, chilled liquid sugar goes into a 40-gal., enclosed stainless steel surge tank. When not being metered into mixers, the syrup is continuously circulated through approximately 500 ft. of 2½-in. dia., asbestos-insulated pipe, past five metering stations, back to the heat exchanger. Temperature of the liquid sugar is thermostatically controlled during circulation.

Metering prechilled liquid sugar into 340-qt. Glen mixers is done in four rooms, scattered on three floors. Sponge, pound and cup-cake batters are prepared in the general mixing room, cookie batters in another room and macaroon batters in a third. Icings are whipped up in a separate room, as are coffee-cake batters.

Continuous Mixing Benefits

Our production department, cooperating with American Machine & Foundry engineers, has satisfactorily adopted a Glen-Oakes cake-batter mixing set-up that has brought about three outstanding improvements:

1. Increased productive capacity. One attendant now continuously mixes and delivers—without manual handling—2,000 lb. of cake batter per hour to the depositor. Maximum rated ca-

pacity of this mixing system is 4,000 lb. per hr.

This advanced engineered mixing technic assures a uniform flow of mix, thus keeping constant the level of the batter in the depositor and thereby improving its accuracy.

2. Better and more uniform quality cakes. Due to the revolutionary mixing principle employed, ingredients going into the Oakes machine are now more thoroughly dispersed in less time to produce better batters.

More uniform batters are prepared, since only small amounts—about 5 lb.—are mixed under similar conditions at one time. And because the batters have greater stability, uniformity and liquid-holding capacity, cakes now have better eating qualities over a longer period.

Continuous mixing with the Oakes unit assures greater yields. And with this extra volume, cakes are baked with a fine, uniform texture.

3. Improved sanitation. Contamination is minimized because the continuous mixing system is a closed one. The mixing chamber is made of stainless steel, and sanitary pipes and fittings are employed. Furthermore, all machinery parts coming in contact with batter are readily accessible and can be dismantled quickly. Sterilizing is done by hooking a steam line to the system.

Mixing Details With the Oakes

Continuous mixing of cake batters with the Glen-Oakes system works this way:

Premix and a controlled amount of compressed air now are continuously fed into the specially designed mixing head of the Oakes machine. The 14-in.-dia. and 2-in.-deep mixing chamber has two identical heads—front and back stators. There are eleven concentric rings of fixed blades on each head. And between both heads is a rotor consisting of eleven concentric rings of blades.

Compressed air and premix are forced into the center of the back stator, toward the periphery of the rotor on one side, over to the other side of the rotor, and finally to the center of the front stator where batter is discharged.

The volume of air is controlled by injecting it into the mixing head under 60 psi. Mixing is done under 40 psi. of pressure to disperse the air uniformly throughout the batter. And with this amount of pressure in the system, batter can be delivered up to 45 ft. from mixer to depositor.

Piping the batter directly to the depositor saves one worker, making him available for other duties.

Other advantages to piping batter are the elimination of wear and tear on the floors and congestion around the depositor. Also, there are fewer mixing bowls to clean.

Formerly, a worker had to remove a 340-qt. bowl from the Glen mixer and transport the bowl on its own dolly to the unloader adjacent to the depositor. Here the bowl was tilted to permit batter to flow into the hopper of the depositor.

Since batter is now directly piped from the continuous mixer, it reaches the depositor with a maximum overrun. Formerly, batch-mixed batters often had a ¾-hr. "floor time" (a wait before the batter could be dumped into the depositor). Naturally, during this time, some overrun was lost.

At this point, it is interesting to mention that AMF engineers have deve'oped a portable treadle switch for regulating flow of batter into depositor. This switch controls the entire operation of the Oakes machine, including air, main-drive motor and material-feed pump. And the switch is operated by the attendant running the depositor.

The Oakes unit is operating 10 hr. on pound cakes and 13 hr. on cup cakes at our Brooklyn plant. Our Boston plant is using this machine to mix batters for sponge and jelly-roll cakes and to whip butter cream icing.

Quick changeover is another notable feature of the machine. It takes less than 2 min. to switch from pound to cup-cake batters.

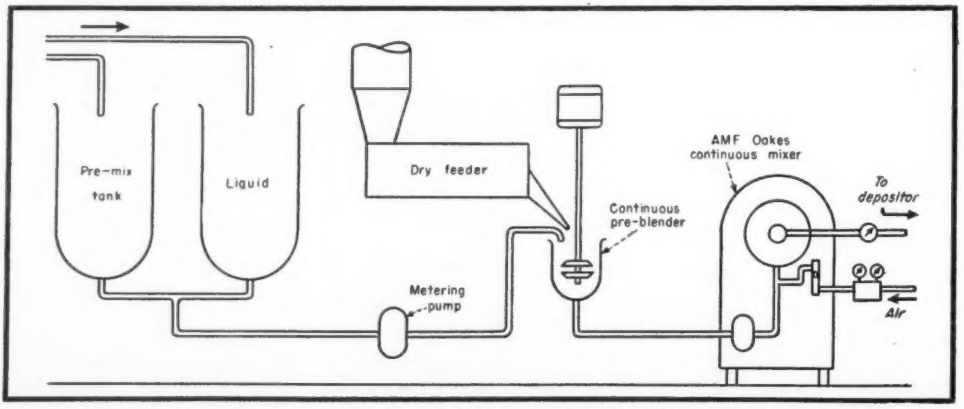
At the end of a run, there is about 25 lb. of batter remaining in the system. This batter is recovered at the depositor and returned to the Glen premixer.

Controlling Density of Batter

Absolute control of the specific gravity of the cake batters results in uniform-quality mixes. And with the combination Flo-Sweet liquid sugar prechilling and Oakes continuous mixing system, this job has been greatly simplified. The operator—and he does not have to be skilled—merely reads the specific gravity required for a particular type of batter on a chart and adjusts the amount of air going into the system on a flow meter.

When running sponge-cake batter, for example, he sets the flow meter to feed 0.60 cu. ft. of air per minute. Settings for pound or chocolate-cake batters is 0.55. For layer-cake batter, it is 0.50.

With the recent deve'opment of a 20-qt. preblender, continuous delivery of premix to the Oakes machine now is possible. Equipped with a disk-type agitator the preblender continuously combines wet and dry ingredients. With the new preblender, it is now possible to get a homogeneous mix in less than 1 min.—even with a complicated pound cake formulation which comprises milk powder, flour, water, eggs and shortening.



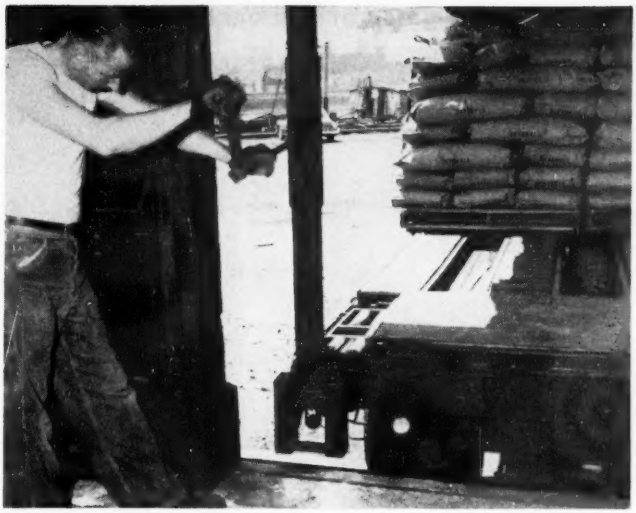
SEMI-CONTINUOUS AMF premixing process features 20-qt. preblender that combines dry and wet ingredients.

Victory Over Hand Labor

Through the practical roller idea detailed here, excessive manual handling in the trucking of bagged dries has been relegated to limbo—with time cut 75 percent.

Now trucks and trailers can be mechanically loaded with pallets to full capacity, speeding shipments of many foods and by-products—sugar, flour, salt, dextrose, coffee, cocoa, nuts, starch, hydrogenated fats, grain feeds, and waste feeds, and numerous others.

The system is termed equally profitable for either palleted bags or cases. The fast operations immediately pay dividends at both wharf and receiver's door.



CLOSEUP AT DOCK illustrates method. Two pallets on carrier-board roll to front. Driver moves another board into place for loading next pallet. He cranks to opposite side for following load.

Ingenious Roller-Bed Trailer Slashes Delivery Costs

Unique conveyor-flooring on vehicle speeds loading and unloading of palletized goods. Handling at terminal and plant also greatly reduced

IVAN C. MILLER
Assistant Editor, "Food Engineering"

For many years bulk dries were loaded at processing plants or wharves by hand, then unloaded the same way at users' plants.

Though slow and uneconomical, manual loading was nevertheless simple, the procedure long established. Not that the advantage of handling bags on pallets with fork trucks were not recognized—they were. But the numerous unsolved problems, always confronted when palletized operations were contemplated, kept old methods entranched.

■ **That is, they did until Pride Transportation Co., of New York City solved the problems—all of them.**

These were the four prime difficulties:

1. Close spacing of dock doors restricted operations to tail end loading. Side filling of vehicles was impossible.

2. Rear ends of the vehicles were higher than the loading docks, often topped them by as much as a foot, resulting in great inconvenience in operations.

3. To enable fork trucks with loads to enter trailer to spot pallets in place, excessively long approach-ramps of gentle slope would be necessary. Yet limited floor space commonly prohibited use of such ramps.

4. Even if fork units could readily enter vehicles, spotting full loads was impossible. Narrow dock doors prevented sufficient maneauverability to load the rear half of the trailer.

Only a radical departure in trailer bed design, aided by a new handling procedure, surmounted all these problems.

The truck company that originated the ingenious trailer bed design was not the only one to benefit. Many food companies—American Chicle Co. of New York, for one—have now been able to get palletized loads of sacked dries, gaining these special advantages:

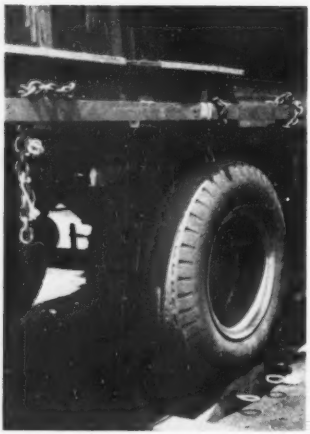
- **Lowered over-all transportation costs**
- **Reduced unloading time**
- **Simplified in-plant handling**
- **Minimized warehouse requirements.**

The Pride company designed and engineered the development of the special bed, then built and rebuilt it. Fabrication was in the company's own shop. Subsequently designs were patented. Now for the details:

First of all, pallet size was determined. Adopted was a pallet to accommodate three bags to each interlocked layer, dimensions 36 in. by 48 in. Two such pallets abreast completely filled the trailer width (limited by New York State law to 96 in.). This prohibited use of truck or trailer with sides (two pallets 44 in. wide is limit in closed vehicle).

In initial attempts involving loading pallets from the rear, a trailer was selected without top and without sides. Four roller-conveyors tracks were laid the length of the bed. It was hoped that pallets, carefully aligned

Loading: Bags go on at National Sugar



1 ELEVATING truck rear on blocks enables easy gravity roll of loaded carrier-boards to front.

2 FORK TRUCK merely lines up rear edge of pallet with carrier-board. Latter is spotted by crank.

3 CRANKED to side position, pallets of bags extend beyond bed, thus makes room for next pallet.

at the rear of the trailer, could be rolled along until reaching their place at the front. Almost invariably, however, pallets traveled to one side or the other. When a pair, each laden with a ton of dries, veered toward the center, they wedged together so tightly when they met that they could not be pried apart without wrecking pallets.

Five-ply boards were then placed between pallets and rollers. These were cut to span the width of the trailer, while depth was the same as the narrow dimension of the pallet. Placed on these boards, a pair of pallets kept relative position, but board carriers often sidled.

Side-Slip Corrected

To prevent such sidewise movement, four roller-guides (see photo of roller mechanism) were attached to the underneath side of the carrier-board, located so as to fit firmly against the outer edges of the two inside conveyors. At last, two pallets resting on a board, each loaded with a ton of sacks, could be rolled forward from the rear of the trailer in true alignment.

A fast labor saving method had thus been developed for loading 20 pallets onto a trailer from the rear. Yet unsolved problems still remained. For this method had to be adopted to loading through doors narrower than the trailer bed.

Furthermore, sacks of sugar, such as going to American Chicle, required complete protection from rain at all times—during loading, as well as in transit. A tarpaulin cover was not feasible. Handling labor was too costly, also product protection was inadequate.

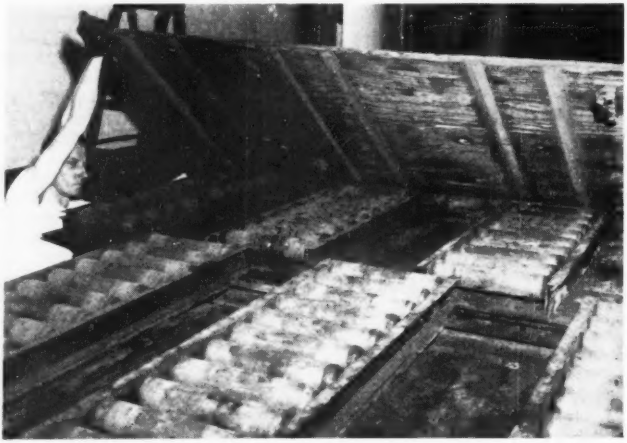
Finally, a heavy canvas top, on metal frame, supported only at front and rear, was adopted. To this frame, side curtains were attached, to be lowered during inclement weather.

New Problems Arise

But when the uprights supporting the top were added at the rear end of the bed, pallets could no longer be placed on the boards, even given warehouse doors wide enough. Space between uprights was much less than the length of two pallets, side by side.

This narrow-entrance obstacle was, at long last, surmounted by installing a "pallet shifter". First step in making this addition was shortening the four conveyors at the rear by the width of a carrier board. In the space between the end of the conveyors and the tail of the trailer, two sets of conveyors were installed, one set above the other.

The top sets of conveyors, replacing sections removed, roll in alignment with the conveyors on the vehicle floor.



INSIDE STORY of shifter device. Note short parallel roller sections. These are welded to plate that moves at right angles on conveyors below. Driver, having unloaded, removes carrier. On its underside are seen guide rollers.

The lower set is installed at right angles to those above. A steel plate, to which the upper set is welded, separates the two sets of rollers.

By this arrangement, a carrier-board, placed on the upper, short-length conveyors, can be moved at right angles on the lower set, until the board clears the doorway and the upright supporting the top.

Shifting the position of the boards is accomplished by turning a hand crank (see lead picture) which, through chain and sprocket, drives a gear-reducer with a windlass on its shaft. A cable around the windlass, and attached to the steel plate on which are mounted the upper conveyors, controls movement of the assembly.

Assuring The Alignment

When the unit has been cranked, so that one of the boards is clear of the door and upright, a loaded pallet is dropped in place. Assembly is then again shifted to clear the opposite board-end of the other upright and door side. With the board in this position first pallet (see loading sequence photos) overhangs the bed by almost a pallet length. Second pallet is then located.

Now, with both pallets in place on the board, the unit is cranked to the center position, with short conveyors lined up with the conveyors on the bed. Guide rollers on the underneath side assure that the board can only be pushed onto the bed conveyors when the alignment is correct.

Once the two conveyors are in line, only a slight push is necessary to make the transfer from the short ones to the long ones. Travel the length of the latter is by gravity.

Whether loading or unloading, little hand labor is needed to roll the pallets. When the trailer is to be loaded, rear wheels are run onto a wedge-shaped block, to elevate the rear end. Conversely, raising the front wheels causes pallets to roll to the rear for unloading.

Two cranking locations are provided, from which boards can be shifted into position. The cranking station used during loading is located in one of the uprights supporting the top. This crank is at convenient height above dock. Station used when unloading from ground, is at bed level. Whether operation is at dock or ground level, cranking is not only convenient but requires little effort.

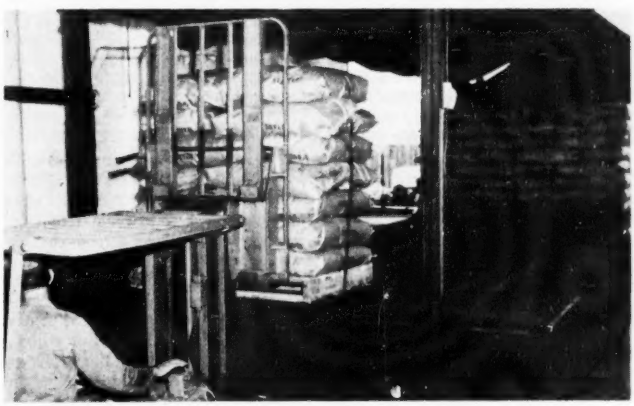
When trucks and trailers were loaded by hand at National Sugar Refining Co., four men usually worked 1 to 2 hrs. to put 400 bags aboard. This took 4-8 man-hours.

(*Turn to page* 155)

Unloading: Bags come off at American Chicle

1 **USING** lower cranking station (set at shoulder height) driver prepares to unload by shifting pallets until bags clear upright.

2 **FORK TRUCK** unloads first pallet of pair. Driver has next pallet in place for unloading by time trucker returns.



3 **MOVEMENT** of carrier-board centers the second pallet of pair for easy unloading. Note projection of assembly (right).

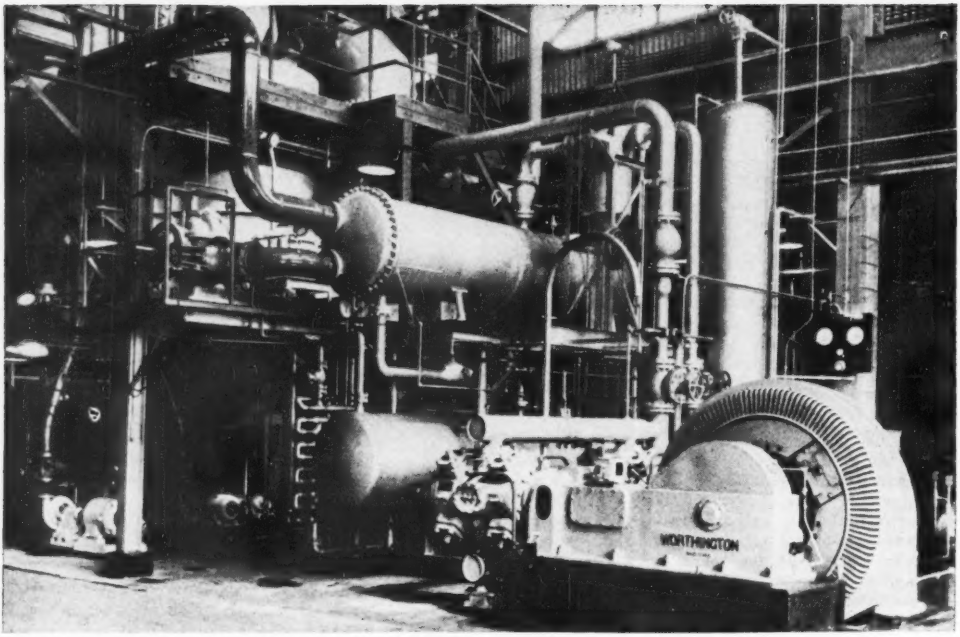


FIG. 1—THIS AMMONIA REFRIGERATION system, 500-ton capacity, does variety of jobs in frozen concentrate plant.

How to Figure Refrigeration Needs

You can do better processing job if you acquire knack—simply explained here—of computing your compression-cooling system requirements

TYLER G. HICKS
Assistant Editor, "Power"

In virtually all food plants, refrigeration is employed—in one form or another. In fact, refrigeration is the very key to many modern food processing methods. Without it some foods couldn't be manufactured, others would cost more, and their quantity would be limited. Quality would suffer greatly in nearly all foods.

Importance of the refrigeration system in the modern food plant is emphasized when we consider the leading role played by freezing and chilling in the processing of ice cream, milk, beverages, baked goods, meats, fish, and a host of other foods.

■ **Accordingly, a knowledge of how to figure refrigeration requirements and cycles can be of first importance to the operator who seeks to do a better-quality, better-quantity job.**

Entailed in this know-how is the basic understanding of how these cooling systems work and what may be expected of them.

Of the several refrigeration systems that have been used—vapor-compression, steam-jet vacuum, absorption, and cold-air—the first named is the most common employed in the food plant and hence will be the basis of our consideration here.

Principle Explained

The vapor compression system calls, in principle, for a liquid that boils at a low temperature, say 0 deg. F., when at low pressure. If we pump this liquid through a pipe coil in a room containing food at 30 deg. F., heat flows from the food to the liquid in the coil. The liquid vaporizes (boils) at 0 deg. F. in a manner similar to water at 212 deg. F. Heat needed to vaporize the liquid comes from the warm food. If we pump enough liquid through the coil and remove vapor as it is formed, we can reduce food temperature to about that of the liquid. Since the liquid changes to a vapor in the pipe coil, the coil is referred to as an *evaporator.*

Refrigerants are not cheap, and their supply in any plant is limited. In addition, certain refrigerants are harmful to persons and objects they contact To operate economically, we must reuse the refrigerant after it has absorbed heat from the food. To do this, the heat absorbed during vaporization must be removed and the gas converted to a liquid. We do this by raising temperature and pressure in a *compressor.* Then water at ordinary temperatures can remove heat from the gas so it condenses to a liquid.

The *condenser* (see Fig. 2) does this job. Refrigerant leaves the condenser at a high pressure and flows to the *expansion valve.* It expands through the valve with a drop in pressure. From the expansion valve it goes to the evaporator to absorb more heat. The various units needed in vapor compression systems, also the direction of refrigerant flow, are shown in Fig. 2.

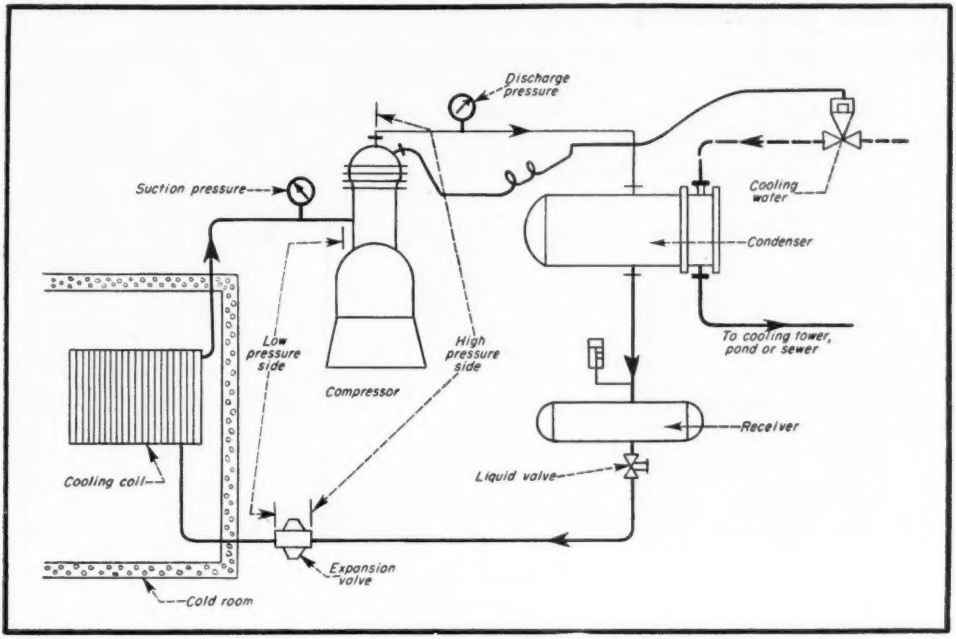


FIG. 2—COMPONENT PARTS needed for operation in a compression refrigeration system are shown. Text covers details.

The usual refrigeration system involves simple boiling, compression, condensation, and fall in pressure through a restricted opening (expansion valve). We can easily show graphically what takes place in this cycle. If we plot the various relations on a chart that shows how the refrigerant behaves at different pressures, we have a valuable guide for our figuring.

Fig. 3 is a skeleton *Mollier chart* for a typical refrigerant. A Mollier chart is a plot of certain properties of a given substance when in the liquid and vapor states. As shown, absolute pressure is plotted vertically and *enthalpy* horizontally. Enthalpy may be termed the number of Btu's that must be added to 1 lb. of a substance to bring it to a certain pressure and a certain temperature above a fixed reference point. As we go through the cycle we will see how enthalpy is used, then its meaning will become clearer. (For more complete Mollier charts of various refrigerants refer to texts dealing with refrigeration).

Line *ab* in Fig. 3 shows the relation between pressure and enthalpy for a *saturated liquid* refrigerant. A saturated liquid is one that vaporizes immediately at constant temperature if any heat is added to it at constant pressure. Removing heat at constant pressure lowers liquid temperature. Line *cd* gives a similar relation for *saturated vapor—i.e.*, a vapor that will become superheated on the addition of heat or will condense on heat removal, both at constant pressure.

To the left of *ab*, the liquid is *subcooled* and has a temperature less than saturated liquid at the same pressure. To the right of *cd*, the vapor is *superheated* and has a temperature higher than saturated vapor at the same pressure.

Let's start with our pipe coil in the food room and assume that refrigerant vapor leaves the evaporator with a small amount of superheat (Point A, Fig. 3). In the ideal cycle the refrigerant is compressed isentropically to condenser pressure. This is a reversible compression without transfer of heat to or from the refrigerant.

Line *AB* shows this process, point *A* being the outlet of the pipe coil and compressor suction entrance. We'll assume this cycle is ideal and modify our results to take various losses into account.

At the end of the compression stroke, the superheated refrigerant is discharged to the condenser, point *B;* and between *B* and *C* the superheat is removed by the cooling water. From *C* to *D* the vapor condenses. It leaves the condenser as a saturated liquid, point *D*, or it may be slightly subcooled, point *E*.

During passage through the expansion valve, *DF* or *EF*, refrigerant pressure decreases, temperature falls to that in the evaporator, and some of the liquid vaporizes. So refrigerant entering pipe coil in the room is a mixture of liquid and vapor. Between *F* or *F'* and *A* the refrigerant absorbs heat from the food.

Problems Illustrate Calculations

To show how this system can be figured quickly and easily we'll take some typical examples:

Problem: A food plant has an ammonia compression refrigeration system with pipe coils at 5 deg. F, condenser 86 deg. F. During passage through the pipe coil the ammonia is superheated to 40 deg. F, and subcooling in the condenser reduces liquid temperature to 60 deg. F. What is the useful refrigerating effect? What is the horsepower input per ton (ideal and actual)? And how much refrigerant must be circulated through the system?

Solution: Starting with the pipe coils where we remove heat from the foods, useful refrigerating effect is found as follows: From a Mollier chart for ammonia, enthalpy of refrigerant leaving the coils is found to be 634.0 Btu. per lb., and enthalpy of subcooled liquid 109.3 Btu. per lb. As shown in Fig. 3, useful refrigerating effect is $h_A - h_E = 634.0 - 109.3 = 524.7$ Btu. per lb.

To find horsepower input, the weight of refrigerant circulated per minute

Two Aids in Calculating

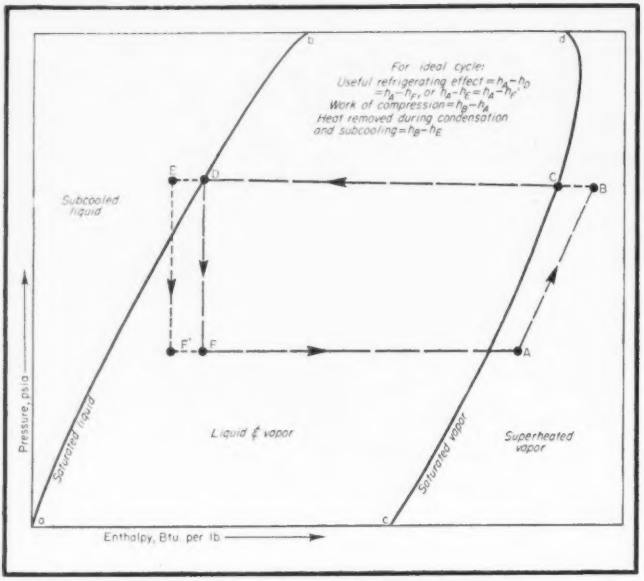


FIG. 3—MOLLIER CHART for a typical refrigerant. It is a plot of properties of a substance when in the liquid and vapor states.

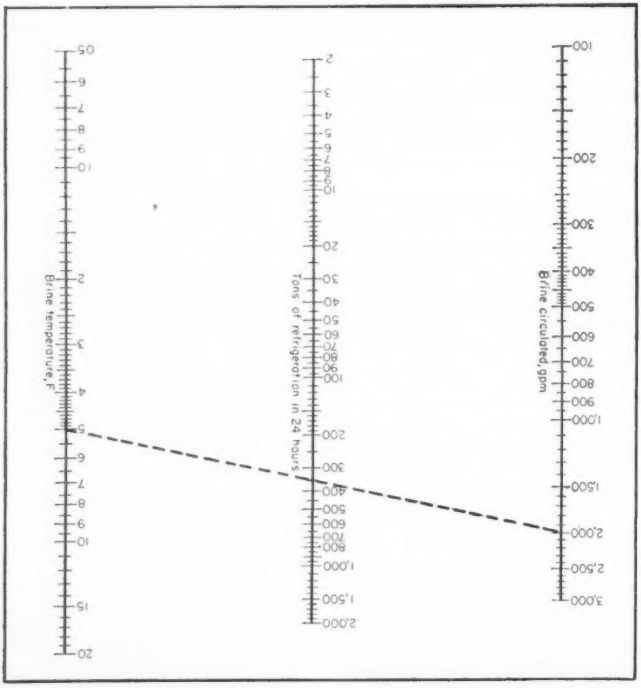


FIG. 4—NOMOGRAPH speeds estimating. When any two of three variables (above) are known, straightedge spots third where line intersects.

per ton must be known. Since 1 ton of refrigeration is heat removal at the rate of 200 Btu. per min., quantity of refrigerant, Q, to be circulated for 1 ton capacity in this system is 200/524.7 = 0.381 lb. per min. per ton. Work of compression, W_c, for the ideal cycle is $h_B - h_A = 742.5 - 634.0 = 108.5$ Btu. per lb.

Then, hp. per ton = $QW_c/42.42$ = $0.381(108.5)/42.42$ = 0.975 for the ideal cycle. Actual horsepower to drive compressor generally runs about 25 to 30 percent greater than for the ideal cycle, sometimes more. For this unit it is about $0.975(1.25) = 1.22$ hp. per ton. Actual power input for ammonia compressors ranges from about 0.7 to about 2.5 hp. per ton.

Problem: Suppose the system in the first problem is to be installed in a plant with a refrigerating load of 50 tons. How much refrigerant must be circulated? And what horsepower motor is needed if overall efficiency of drive is 80 percent?

Solution: For 50 tons capacity, $50(0.381) = 19.05$ lb. per min. of refrigerant must be circulated. Motor horsepower must be at least $50(1.22)/0.80 = 76.2$. A motor with the next higher standard rating would probably be chosen.

Load Determination. Finding the load that a refrigeration system in a food plant must carry can be a complex problem, because not only must heat be removed from stored food but the heat gain through walls, ceiling and floors must be compensated. In addition, there are heat gains from other sources, such as air leakage, human occupancy, and motors and lift trucks operating in the room. However, a simple example will help indicate the general procedure (for more complex jobs refer to a text on food refrigeration):

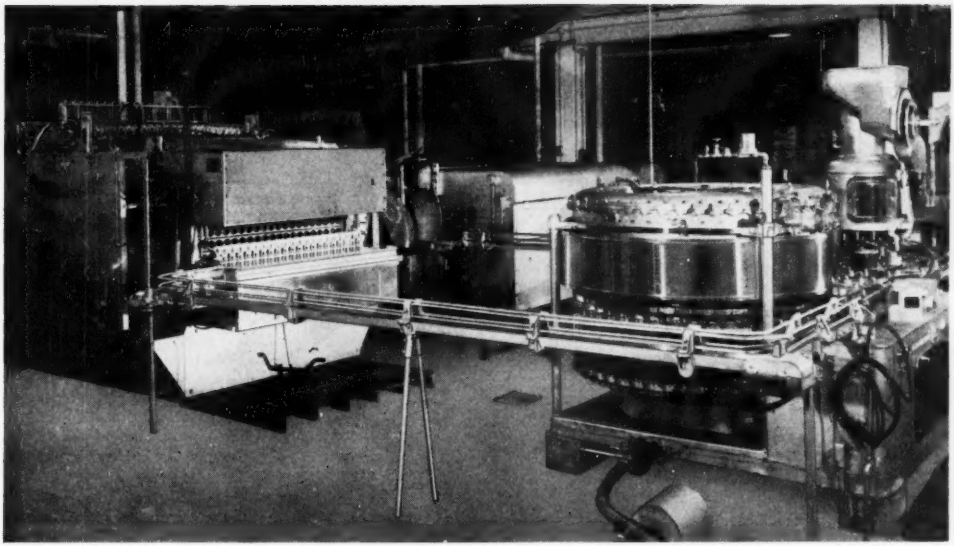
Problem: How much refrigeration is needed to cool 1,000 gal. of milk from 70 deg. F. to 40 deg. F. in 4 hr. if the specific heat of milk is 0.9 and weight 8.59 lb. per gal?

Solution: Weight of milk to be cooled is $8.59(1,000) = 8,590$ lb. Heat to be removed is $8,590(0.9)(70 - 40) = 231,930$ Btu. in 4 hr., or $231,930/4 = 57,983$ Btu. per hr. Since 200 Btu. per min. = 1 ton, $57,983/200(60) = 4.82$ tons, say 5 tons capacity.

How Brine Is Used

The refrigeration system we have dealt with thus far has been the *direct-expansion* type. In this system the pipe coil is placed in the room to be cooled and the liquid refrigerant allowed to expand into the coil. In contrast, an *indirect*, or *brine*, system has a tank or tubular cooler in which brine is cooled by the refrigerant. The brine

(*Turn to page* 156)



SPEED of pasteurizer in this Ambrosia bottling line has been increased from 12 to 30 bbl. per hour as a result of sanitation procedures that allow less severe heat treatment.

Sanitation Sets New Pace

Extra care in clean-up activities at Ambrosia Brewing triples output by permitting rapid pasteurizing technic. And the resulting beer has a unique "draft" taste

FE STAFF

Brewers who primarily serve a local area operate under towfold vigil.

First, they are ever alert to consumer acceptance in a market that's outstandingly pressured by national distributors. Second, they thoughtfully watch production costs, since they are denied the bulk economies of larger operators.

Yet these very obstacles often form the modest-size brewer's strength. For they inspire improvisation and process improvement that sometimes is missed in multi-kettle plants.

A case in point is the shake-up of the established system of pasteurization at Ambrosia Brewing Co., Chicago. By working out a sanitizing and beer handling method that allows drastic reduction in time and temperature of in-bottle pasteurization, this brewery has realized two significant advantages:

1. **Reduced costs**—by multiplying pasteurizer capacity, saving steam and water and removing the need for additional equipment

2. **Improved acceptance**—with a bottled beer that approximates draft beer in taste and still has suitable shelf life

Let's go back three years to the decision that led to this change. At that time, the demand for the company's beer not only was swollen, but was continuing to grow. Yet funds were not available for further expansion in the bottling house, which had been completely rebuilt in 1948.

Speeding Pasteurizer

A way to increase output without need for new equipment suggested itself. In one of the bottling lines, a newly installed 50-spout Meyer filler was located in series with an older, lower capacity Meyer Cataract pasteurizer. A standard 140-deg. F., 20-min. bottle treatment in the latter caused the high-speed filler to idle along at one-third capacity.

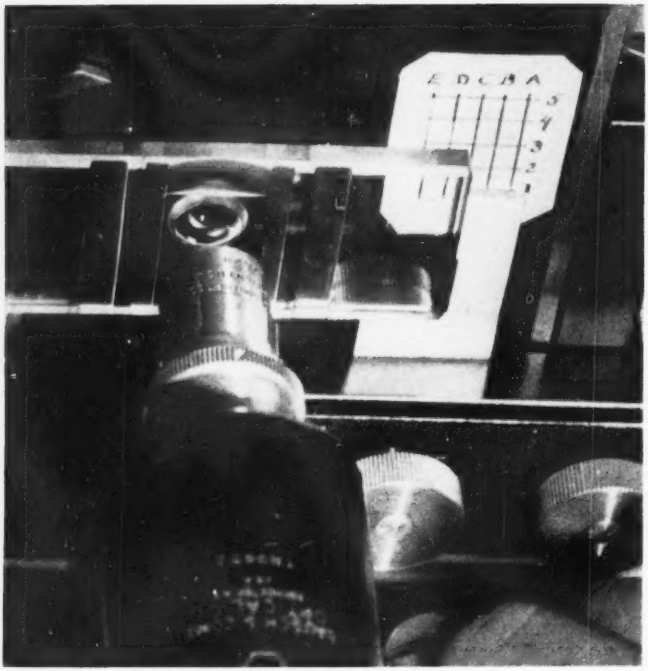
Management asked, "Would it be possible to speed up the pasteurizer to more nearly match the filler—and at the same time not endanger beer stability or flavor?"

Brewmaster John Joerg then started a series of tests to determine where this critical point of pasteurizing speed vs. beer stability fit into his process. His first logical step, however, was to revamp the plants sanitizing schedule so that beer coming to the fillers would be as completely free of molds and bacteria as was humanly possible.

With this closely guarded beer, Joerg soon found that it was possible to cut down the pasteurizing time to as little as 3 min. and still achieve desired stability in the quick-turnover, locally marketed beer. As a matter of fact, beer pasteurized by this rapid method was found to have a satisfactory shelf life of more than 12 weeks—a good safety factor in a product that normally is consumed within a few weeks after bottling.

Two problems appeared in this fast pasteurizing method. First, to approximate 140 deg F. in the bottle for 3-min. passage, an excessively hot water was needed in the pasteurizer sprays. This, acting on the cool entering bottles, could cause thermal shock and cracking of glass. To offset this, the water-spray temperature was low-

(*Turn to page* 153)



DEVICE placed on stage permits pre-selecting of field for mold counting without straining vision of technician using microscope.

Speed Your Mold Counts With This Handy Grid

It precisely maps microscope field—thus increasing accuracy and shortening training of novices. Aids veteran technicians, too . . . 'Scope hints included

PAUL L. BEACH

Research & Development, John H. Dulany & Son, Inc., Fruitland, Md.

Mold counting in your operation won't be drawn out, open to error, or hard to teach—if you adopt the grid-coordinate method.

■ **This improved system so simplifies and expedites the technic that neophyte counters have been trained from scratch on tomato products in only a couple of days.**

■ **In fact, one of our own control department girls, with no previous microscope experience, was accurately conducting all mold counting in a mere day and a half of instruction and supervised practice.**

Plenty of proved demonstration now lies behind the procedure, both in the successful teaching of beginners and in the re-training of veteran technicians. We have had excellent results with the system at John H. Dulany & Son Inc., Fruitland, Md.

A Word About the Job

It is, of course, well known that if such counting is to be exact and comparable, in accordance with the Howard Procedure, a very methodical technic must be developed. Commonly, the ability is quite difficult for the novice to acquire, especially if he is unfamiliar with microscopic equipment.

Biggest stumbling block for the trainee has been attainment of the ability to observe, in an orderly way, 25 separate and different spots on a slide—while being at all times sure of his exact counting location.

True assurance and skill are never obtained until the student is certain of his slide-whereabouts. Make no mistake about it—while the mold counter is troubled about his position on the slide, he is not using all of his energy and capacity in mold identification and in determination of the positive or negative nature of each field.

Grid Way of Doing It

The new method enables the beginner to obtain quickly the competence and assurance necessary for fast, accurate work. Used is the modified rectangular "Howard Mold-Counting Chamber," rather than the round one. And the initial step is to add a "road map" of grid coordinates, drawn upon the microscope stage.

This grid is made and calibrated in several successive steps. Here are directions: First, place the chamber on the stage with the printing right side up (chamber should always be in this position when using coordinates). Next, by looking in the microscope, locate the corners of the chamber's rectangular platform by making the sides at each corner tangent to the corner field. Now, with a pencil, make a dot upon the stage itself, at the position of the upper right corner of the counting chamber, doing this for each successive corner of the chamber platform.

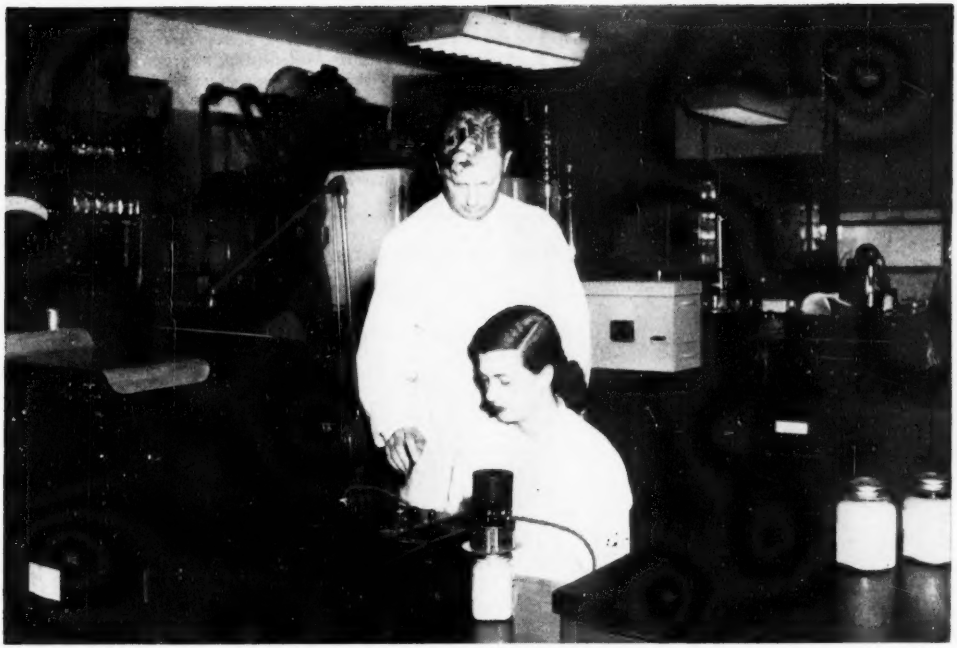
After penciling in, on the stage, the rectangle outlined by the four dots, cut a piece of paper ⅛ in. larger all around than the rectangle (a white gummed label or any other white paper is suitable) and paste it over the rectangle drawn on the microscope stage.

Locate corners on the paper as was done on the stage. When the rectangle is drawn, divide the sides in half, then these halfs in half. With indelible ink, draw lines to mark off the divisions. Coordinate points are where any lines cross, 25 points in the rectangle. Number sides (as seen in photo): Outside vertical side from 1 to 5, upper horizontal side from A to E.

You are now "in business" on the fundamentals.

Mount the sample of material to be counted upon the platform in the manner described by the Howard Method. Adjust the stage so that the upper right hand corner of the chamber is at position 1-A (see grid in photo). While looking into the microscope, adjust the stage so that this corner field is tangent to the corner side of

(*Turn to page* 151)



REFLECTOMETER readings showed effect of bisulfiite and temperature on keeping quality of grated horseradish. Here, Author Davis instructs Technician Evelyn Barnes on operation of the Photovolt Reflectometer.

Bisulfite Keeps Horseradish Fresh

When added to product at time of grating it slows color and flavor changes, thus greatly extending shelf life. Storage temperature determines amount needed

LYLE L. DAVIS

Virginia Agricultural Experiment Station, Blacksburg, Va.

Shelf life of grated horseradish may be prolonged from 100 to 200 percent by the addition of a small amount of potassium metabisulfite at the time of packing.

This treatment brings about a retention of pungency, aroma, and odor, as well as color (which appears to change in direct proportion to loss of volatiles).

Temperature of storage governs the amount of bisulfite needed. At normal room temperature (70 to 75 deg. F.), a concentration of 0.05 percent potassium metabisulfite will provide excellent protection. At 110 deg. F., however, as much as 0.20 percent is required.

Horseradish roots, *Cochlearia armoracia L.*, are dug in the late fall or early winter after development of the volatile oil, butyl sulfocyanate, near its maximum concentration in the outer portion of the roots.

Cleaning and grating of the roots into vinegar, with or without a little salt, may follow at once. Or they may be stored at 32 to 40 deg. F. for 6 to 7 months and grated as needed. A dehydrated product can also be made by drying the grated sulfured roots.

Since butyl sulfocyanate (and possibly other unknown compounds responsible for the flavor and aroma) is lost by exposure of the grated horseradish to air and light, many manufacturers prepare only an amount that will be sold during a 2 to 3 week period. However, roots stored under refrigeration, prior to preparation, also slowly lose their aroma, and therefore processors have had to resort to the use of artificial flavor to maintain the strength of the aroma in the product grated at the later part of the storage period.

In an effort to find ways to prolong the shelf life of horseradish, special studies were carried out at the Virginia Agricultural Experiment Station.

Experimental Procedure

Fresh roots of the season's growth were cleaned and grated into vinegar, according to the usual commercial practice, on Dec. 1, 1949. This material was uniformly blended and divided into four lots, to which potassium metabisulfite was added in varying concentrations—0.05, 0.10, 0.15, and 0.20 percent.

Ten 100g. bottles, of the type used by commercial packers, were filled to the top with horseradish from each lot, making a total of 40 bottles. Then four bottles from each of these 10-lots were tightly sealed, and two of

each four were placed in an incubator at 110 deg. F., while the remaining jars were stored on a laboratory shelf at 70 to 75 deg. F. After 8 weeks of storage, the samples were subjectively examined for pungency and aroma. Results are reported in Table I.

The other 24 bottles were divided into two 12-sample groups (three jars from each of the remaining 6-lots). One group was placed in an incubator at 110 deg. F., while the other 12 samples were put on a laboratory shelf and held at 70 to 75 deg. F.

Since it appears that color change parallels loss of volatiles, each of the 24 samples was examined with a Photovolt reflectometer at weekly intervals for six weeks, without opening the bottle. Tests were made for reflected color (using a green filter) by directing light from the search unit on the clear glass side of the bottle.

The reflectometer was standardized with a white enamel plate having a reflectance of 100. This plate had been standardized by the manufacturer against a zinc oxide plate by the method as outlined by Judkins*. The color tests are reported in Table II.

TABLE I—HOW RETENTION OF PUNGENCY, Aroma, and Color of Horseradish Stored 8 Weeks Is Aided by Potassium Metabisulfite

Storage Temperature Deg. F.	$K_2S_2O_5$ Percent	Pungency*	Aroma and Odor**	Appearance	Crispness
110	0.05	5	4	brownish grey	soft
110	0.10	5	4	brownish grey	soft
110	0.15	4	3	little brown	soft
110	0.20	3	3	light amber	soft
70-75	0.05	2	2	very slight amber	soft
70-75	0.10	1	2	similar to original	soft
70-75	0.15	1	1	similar to original	crisp
70-75	0.20	1	1	similar to original	crisp

*Scored on a basis of 1-5
1 Strong, resembling fresh product
2 Less than 1, and mildly strong
3 Less than 2, unacceptable
4 Trace
5 None

**Scored on a basis of 1-4
1 Characteristic fresh aroma
2 Less than 1, slight decaying organic matter odor
3 No horseradish aroma, moderate decaying organic matter odor
4 No horseradish aroma, strong decaying organic matter odor

TABLE II—EFFECT OF POTASSIUM METABISULFITE on Color of Grated Horseradish as Shown by Photovolt Reflectometer. Readings Made With Green Filter.

Sample	Temperature Deg. F.	$K_2S_2O_5$ Percent	Photovolt Readings: Fresh Material Dec. 1	1 Week After Dec. 8	2 Weeks After Dec. 15	3 Weeks After Dec. 22	4 Weeks After Dec. 29	5 Weeks After Jan. 5	6 Weeks After Jan. 12
1 a	110	.05	43.0	40.5	35.0	34.5	34.0	34.0	28.5**
1 b	110	.05	44.0	39.0	36.0	33.5	32.5	32.5	28.5
1 c	110	.05	40.0	35.0	35.0	34.0	33.0	33.0	32.0
Average			42.3	38.2*	35.3	34.0	33.2	33.2	30.5
1R a	70-75	.05	40.0	40.0	40.0	39.0	38.5	38.5	38.0
1R b	70-75	.05	41.0	40.5	40.0	39.0	39.0	39.0	39.0
1R c	70-75	.05	42.0	41.0	41.0	40.5	39.5	39.5	39.0
Average			41.0	40.5	40.3	39.5*	39.0	39.0	38.7
2 a	110	.10	40.0	38.0	28.0	27.0	26.0	26.0	25.0
2 b	110	.10	40.0	37.0	27.0	26.0	25.5	26.0	24.5
2 c	110	.10	41.0	34.0	31.0	29.5	29.5	29.5	29.0
Average			40.3	36.3*	28.7	27.5	27.0	27.2	26.2
2R a	70-75	.10	38.0	36.5	36.5	35.5	35.5	35.0	35.0
2R b	70-75	.10	39.0	40.0	38.5	38.5	38.0	38.0	38.0
2R c	70-75	.10	40.0	40.0	39.5	39.0	39.0	38.5	38.0
Average			39.0	38.8	38.2	37.7*	37.5	37.2	36.2
3 a	110	.15	42.0	39.0	33.5	30.5	29.5	29.5	28.0
3 b	110	.15	42.0	37.5	35.0	34.5	34.5	34.0	33.0
3 c	110	.15	39.0	35.5	35.0	34.0	33.4	34.0	32.5
Average			41.0	37.3*	34.5	33.0	32.5	32.5	31.2
3R a	70-75	.15	44.0	43.0	42.0	41.5	40.5	40.0	40.0
3R b	70-75	.15	40.0	40.0	40.0	39.0	39.0	39.5	39.0
3R c	70-75	.15	40.0	40.0	40.0	39.0	39.0	39.0	38.5
Average			41.3	41.0	40.7	39.9*	39.5	39.5	39.2
4 a	110	.20	41.0	39.0	37.5	36.0	36.0	36.0	34.0
4 b	110	.20	40.0	39.0	38.5	37.0	37.0	36.0	34.5
4 c	110	.20	40.0	39.0	37.5	37.5	37.0	36.5	35.5
Average			40.3	39.0*	37.8	36.8	36.7	36.2	34.7
4R a	70-75	.20	40.0	40.0	40.0	39.0	39.0	39.0	38.5
4R b	70-75	.20	41.0	41.0	40.5	40.0	39.5	39.5	39.0
4R c	70-75	.20	40.0	40.0	39.5	39.0	39.0	39.0	38.5
Average			40.3	40.3	40.0	39.3*	39.2	39.2	38.7

*Significant at 5 percent level
**Numbers less than 33 indicate unacceptable product

Results

Subjective judgments presented in Table I are, in broad terms, in agreement with objective measurements presented in Table II.

A storage temperature of 110 deg. F., as contrasted to that of 70 to 75 deg., accelerated the rate at which pungency and natural aroma were lost, unacceptable odor occurred, and amber to brown color developed. An increase in concentration of potassium metabisulfite from 0.05 to 0.20 aided in retaining pungency and aroma, particularly at room temperature.

An unattractive odor did not develop in those samples in which 0.10 percent or more sulfite was added and storage was at room temperature, and those with concentrations of 0.15 and 0.20 percent did not undergo physical changes resulting in loss of crispness. Color deteriorated less rapidly at the higher concentrations of sulfite and at the lower temperature.

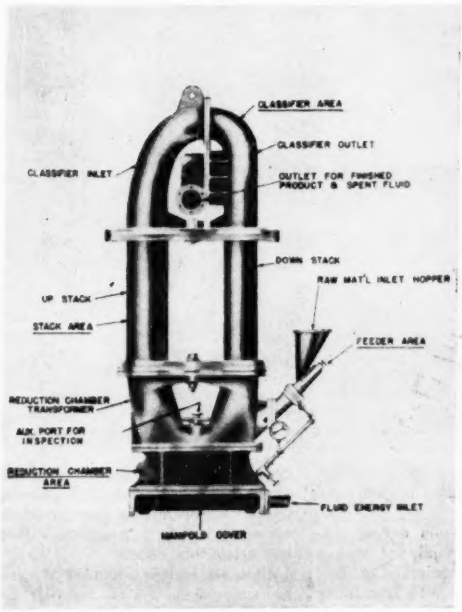
When color deterioration was measured with the reflectometer, small differences, not yet discernible to the eye, appeared more quickly in horseradish held at 110 deg. F. than at the 70-75 deg. F. room temperature (Table II). This deterioration of initial color occurred in one week for horseradish stored at 110 deg. F., while it took three weeks at 70-75 deg.

An acceptable color, as measured with the reflectometer, varies between 33 and 43. As numbers fall below 33, horseradish becomes more and more brown, and it begins to develop the odor of decaying organic matter. Above 33, color is lighter, flavor better.

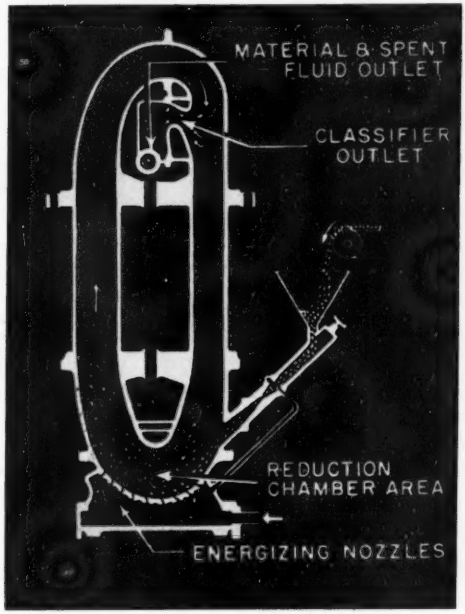
An increase in concentration of potassium metabisulfite, from 0.05, 0.10, 0.15, to 0.20 percent, decreases the rate of browning at 110 deg. F. at each level. No benefit is secured, however, by increasing the level from 0.05 to 0.15 percent in horseradish stored at room temperature. However, a further increase to 0.20 percent will prolong the shelf life at room temperature for as much as six weeks, with only a small change in color and flavor.

*Wesley P. Judkins "The Relationship of Leaf Color, Nitrogen, and Rainfall to the Growth of Young Peach Trees." *Proc. Amer. Soc. Hort. Sci.* 53, 29-36, 1949.

NEW EQUIPMENT & SUPPLIES



Component Parts



Working Scheme

Mill Produces Sub-Micron Particles in Continuous Process

This compact, "motionless" mill, which reduces material to sub-micron particle sizes (much smaller than the limits of the finest mesh), offers advantages as a continuous-feed reduction process. Further, particles can be controlled in uniformity and shape.

Known as the Fine Particle Mill (sometimes termed a fluid energy mill), it can bring material down to particles as much as 100 times smaller than can be seen by the human eye. In the low-micron and sub-micron ranges this system is stated to consume less power than mechanical methods.

The action follows the principle of fluid energy attrition. Raw material of minus 4 mesh, or smaller, is introduced continuously into the inlet hopper (see illustrations).

An injector feeds the material from the hopper into the reduction chamber. Pressurized fluid, air, steam, or any gas or vapor, enters the manifold and is discharged through suitable nozzles into the reduction chamber at sonic or supersonic velocities. Feed material is entrained by the stream of circulating gas.

The violent jet action in the reduction chamber works to break up the individual particles through impact and abrasion. As particles are whirled in the mill they reduce each other.

Centrifugal force shifts the larger particles toward the outer periphery. The smaller particles work toward the inside as they are reduced to desired sub-micron size, then escape with spent fluid through the classifer outlet into centrifugal type collectors.

The motionless mill (has no moving parts) takes up comparatively little floor space. It may be confined to an area as small as 8-ft. x 12-ft., including grinder and collectors.

Mills are presently available in two sizes. Model 0405 is the small unit, capacity 200 to 1,800 lb. per hr. feed rate. Model 0808 is the larger—400 to 6,500 lb. per hr. feed rate.

Cost of grinding for the majority of products in low-micron and sub-micron sizes ranges from $2 to $10 per ton.

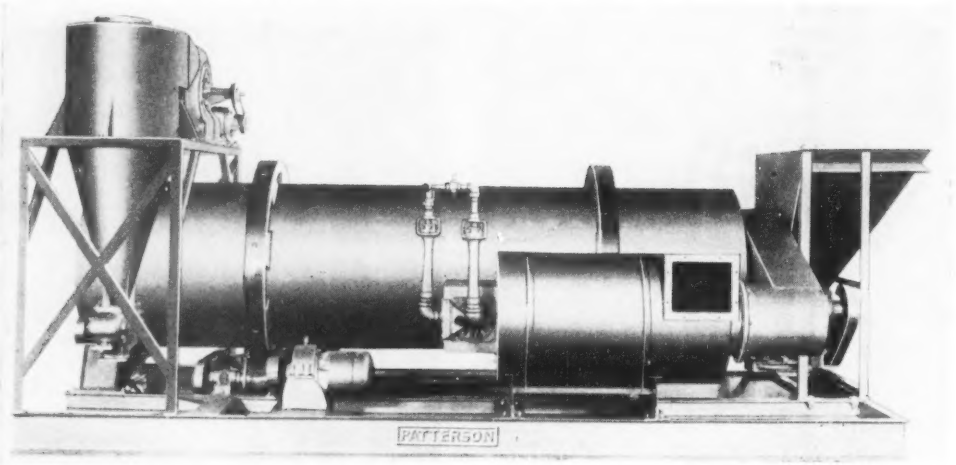
Other operations may be integrated with grinding in the mill, such as drying, coating, blending, breaking up agglomerates, and effecting chemical reactions. Many variables are possible in securing desired "climate" for processing materials. Fluid energy medium may be controlled in temperature from super-heated steam to refrigerated gases. Velocity, humidity, and pressure also may be regulated to suit the process.

The technic is visualized as a means of improving product quality in food processing in the following ways: Production of finer texture of finished product, more uniform distribution of ingredients, more enduring suspensions of solids in liquids, faster chemical reactions. Where color is a factor, finer particles produce more uniform color. Accurate control of grinding "climate" insures color matching.

Mills were formerly leased or rented, now may be purchased outright.—*G. H. Wheeler Manufacturing Co., 19th St., & Sedgley Ave., Philadelphia 32.*

Circle 115A on Reader Service Card

Packaged Dryer Is Compact, Sturdy, Easy to Install



Announced is a packaged drying unit for the processing of such food products as bread crumbs, table salt, cereals, fruits, vegetables, meals and grains.

Packaged construction, maker states, results in a sturdily built, compact dryer assembly, economical to install and maintain. Unit consists of a rotary dryer with drive, screw feeder, air heater, fan and dust collector integrally mounted on a steel frame.

Food materia's to be dried flow directly and continuously to sanitary interior of dryer via a special feeder. Uniformly dried product is discharged continuously.

To maintain optimum drying conditions, the unit is equipped with a drive that permits variation of feed rate over a range of 3 to 1, enabling operator to meet any variation in drying characteristics of material.

Pre-heated air is provided by an oil- or gas-fired air heater; steam also may be used as a source of heat. Dryer is equipped with automatic thermostatic control. There is no recycle of dryer air in this system. Fresh air is drawn in for the full make-up. Gases of combustion pass in direct contact with food products without any deleterious effects.

Units are built in a number of standard sizes—2 ft., 2½ ft., and 3 ft. dia. And in lengths from 10 ft. to 24 ft. They are available in plain and stainless steel, as well as with pure white acid-resistant and abrasion-resistant Porox linings.—*Patterson Foundry & Machine Co., St. George St., East Liverpool, Ohio.*

Circle 116A on Reader Service Card

Unit Fills, Seals Envelopes Quickly, Accurately

Powdered foods are precisely metered into individual envelopes at high speed by the Uni-pak machine.

It heat-seals materials such as cellophane, foil, paper or fiberless cotton film. A continuous strip of envelope material unreels from two rolls.

Unit is particularly applicable to use in handling powdered milk, instant coffee, chocolate, and other beverage powders, because proper amount for sing'e cup or glass is scientifically measured.

On many materials, a rate of up to 200 units per minute is practical. High speed can be maintained almost independently of other units in the packaging setup because the machine creates its own containers as they are filled. Rate is controlled by a variable speed unit and depends on material and size of packet.

Machine will make and fill packets 1¾-in. to 3-in. wide and from 1½- to 9-in. in length. It can be set to make two sizes of envelopes at a time—one on each of two production lines. Parts necessary for a'ternate size envelopes are readily available as extras. Material to be packed is fed in metered amounts onto the continuous strip of cellophane, foil, or other envelope material.

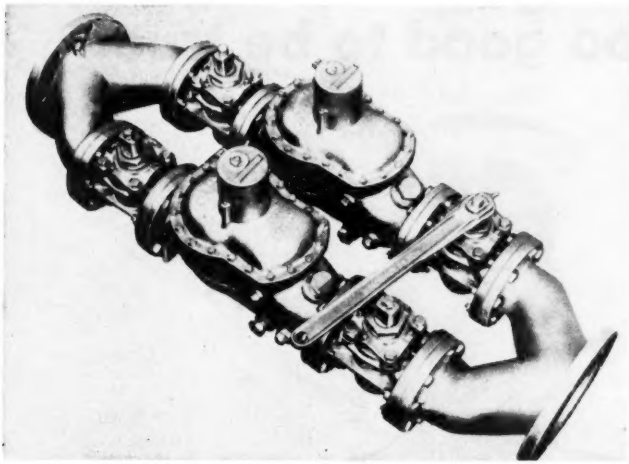
As the continuous strip of envelope material unreels from the stock roll and along a flat bed, the material is deposited on it in individual, spaced mounds by a metering hopper. Another continuous strip then covers the material and the combined assembly enters a thermostatically controlled heat-sealing roll. This roll seals the edges and separates the mounds by sealing lateral'y across the strip, which is then automatically divided into individual packets by a cutoff knife.

Machine is completely automatic. After hopper and paper rolls are loaded and envelope material web is properly threaded, only a minimum of supervision is necessary.

Unit operates on 220v., 60-cycle, single-phase, 1/3 hp. motor. Base is of we'ded steel construction with enameled finish. Floor space approximately 2-ft. wide, 4-ft. long and 5-ft. high is required.—*The Sperry Corp., E. G. Staude Div., 2675 University Ave., St. Paul 4, Minn.*

Circle 116B on Reader Service Card

Compound Meter Manifold Unit Avoids Plant Shutdowns



Proper meter maintenance without costly shutdowns or extra-hour work is reported provided by a new compound meter manifold unit. Manifold assembly consists of two Pittsburgh-Empire single register compound meters in combination with four Nordstrom lubricated plug valve and two 8-in. reducing manifolds, so arranged that one side may be shut down for maintenance without complete interruption of service.

By thus isolating one side, a meter can be removed and exchanged for one serviced and calibrated in the shop, while the flow continues through the other meter passage.

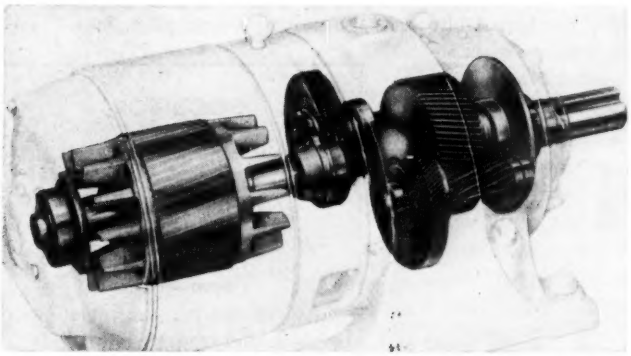
It is also stated possible, with this assembly, to check-test a meter in place without a break in service. To make such a test, the discharge valve of the meter may be shut off and the test plug in the meter body used for the test run.

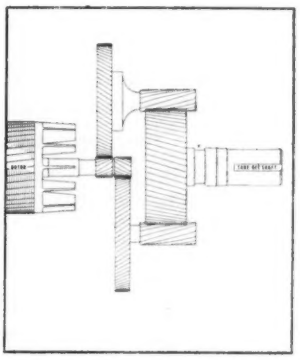
Manifold assembly has the same flow capacity—1,600 gpm.—as the American Water Works Assn. requirement for a 8-in. compound meter. As a unit, it has a laying length that is within the AWWA standard for a single 8-in. compound meter.

Battery can be handled as a complete assembly or broken down into sections, with the heaviest 170 lb.—*Rockwell Manufacturing Co.*, 400 *North Lexington Ave., Pittsburgh* 8.

Circle 117A on Reader Service Card

Compact Gear Motor Doubles Effective Torque Rate





By use of two secondary pinions, instead of one, to drive the output gear, the effective torque rate is doubled on the Synerogear motor.

This arrangement of duplex gears has been made without increasing the motor's external dimensions. Low speeds can be obtained—from 5 to 84 rpm.

The primary dual pinion, mounted on a splined shaft, is of herringbone design to permit equalization of the load to the duplex gears. The gear compartment is completely sealed to prevent entrance of dust and dirt.

Other details engineered to provide longer life include the following: The rotor shaft is mounted on single bearings at the outer end and double bearings at the pinion end. King size ball bearings support the loads of the secondary pinions, and heavy duty roller bearings carry the load of the take-off shaft.

An oil seal prevents leakage around the shaft. Inspection of gears is convenient through removal of the shaft end bracket.

The motor occupies little more room than a standard motor, and ensemble is streamlined and completely weatherproof. Operation is termed quiet, without vibration.

Unit is available in two gear arrangements—Type GL, double reduction, and Type GM, triple reduction. Models are built in sizes 1 to 25 hp.—*U. S. Electrical Motors, Inc.*, 200 *E. Slauson Ave., Los Angeles* 54.

Circle 117B on Reader Service Card

Almost too good to be true!

Remember the kid down the street your mother always used as a model for you? He was almost too good to be true!

Now, Patapar Vegetable Parchment also may seem almost too good to be true. Imagine a paper that's strong when wet, that can be boiled and remain beautiful, that is grease-resistant, odorless and tasteless.

Hard to believe? If so, we invite you to send for full details about Patapar. Standard weights and types of Patapar take care of most needs. However, when special qualities are required, such as extreme grease-proofness, special types of Patapar are recommended. Altogether we've developed 179 different types.

This Keymark, nationally advertised symbol of wrapper protection, can be included on printed Patapar wrappers.

If you anticipate some future use of Patapar, now is the time to get the complete story. Write today for Booklet T, "The Story of Patapar."

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GOOD FOR:

Butter wrappers
Ham boiler liners
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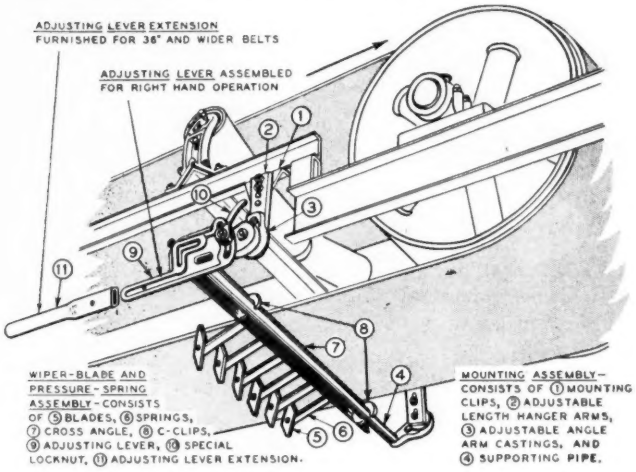
Milk and cream can gaskets
Bacon wrappers
Vegetable wraps
and many other uses

Patapar is furnished plain or beautifully printed in one or more colors.

Patapar
REG. U. S. PAT. OFF.
HI-WET-STRENGTH
GREASE-RESISTING PARCHMENT

Easily Installed Device Cleans Conveyor Belts


ADJUSTING LEVER EXTENSION FURNISHED FOR 36" AND WIDER BELTS
ADJUSTING LEVER ASSEMBLED FOR RIGHT HAND OPERATION
WIPER-BLADE AND PRESSURE-SPRING ASSEMBLY - CONSISTS OF ⑤ BLADES, ⑥ SPRINGS, ⑦ CROSS ANGLE, ⑧ C-CLIPS, ⑨ ADJUSTING LEVER, ⑩ SPECIAL LOCKNUT, ⑪ ADJUSTING LEVER EXTENSION.
MOUNTING ASSEMBLY - CONSISTS OF ① MOUNTING CLIPS, ② ADJUSTABLE LENGTH HANGER ARMS, ③ ADJUSTABLE ANGLE ARM CASTINGS, AND ④ SUPPORTING PIPE.

When mounted under the return run of a conveyor belt, this spring-type cleaner, readily installed on the conveyor supports, will remove wet, dry or sticky material that fails to discharge from the belt. It leaves the conveying surface clean and practically dry. Maker says it will not injure belt.

Further, material is prevented from dribbling over entire length of return belt or from building up on snub pulleys with resulting dangerous increase in belt tension.

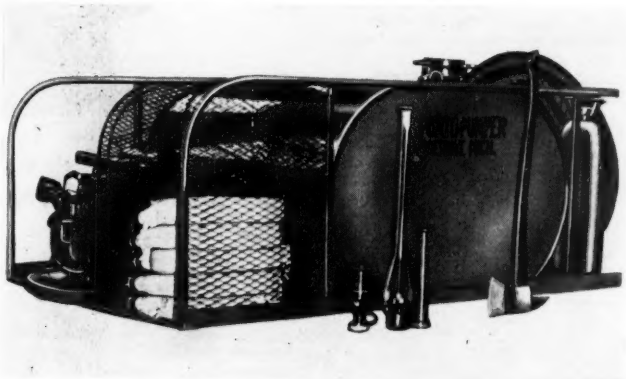
Unit has no moving parts and requires no power. Cleaner consists of a row of thin, spring-steel wiper blades, set perpendicular to the belt surface, but diagonal to the belt travel. Each blade is pivoted upon an individual flat spring, which presses the wiping edge gently, but firmly, against the belt.

The pivoted connection allows each blade to seat uniformly on the surface of the belt. As the belt travels past the cleaner, each blade wipes a path clean and dry. Blades overlap to cover the entire carrying width. Dirt and slime cannot crowd past blades.

Each cleaner consists of two unit assemblies (see illustration). The mounting assembly (1, 2, 3, 4) can be adapted to suit any conveyor frame. The wiper blade and pressure spring assembly (5, 6, 7, 8, 9, 10, 11) includes a cross angle, a pressure-adjusting lever and locking screw, and two C-shaped clips that support the assembly and permit easy removal for replacement of blades.—*Stephens-Adamson Mfg. Co., Aurora, Ill.*

Circle 119A on Reader Service Card

Fire Fighting Unit In Portable "Package"



This versatile, portable pallet model unit quickly converts your truck into an effective industrial fire fighting apparatus.

Known as the Porto Pumper, its basic equipment comprises a water tank with capacity in excess of 200 gal., hose rack with 600 ft. of 1½-in. discharge hose, a rotary positive displacement type rubber gear pump powered by a 4-cycle gasoline engine, supply hose, aluminum extension ladder, 200 ft. fire hose, fire axe, hand extinguisher, straight stream nozzle, and combination fog and straight stream nozzle.

Pumping unit is readily demounted and may be rapidly carried to the water source—hydrant, well, ditch, pond or stream. Rubber gear construction of pump permits use of either dirty or clean water. Excellent performance is reported obtained with straight stream nozzles, fog nozzles or foam equipment. Pump's wide base permits its placement and operation on soft ground.

This slip-on unit can be easily and quickly removed from the truck at any time, releasing the carrier for other gainful uses.—*Porto Pump, Inc., 227 Iron St., Detroit 7.*

Circle 119B on Reader Service Card

Want More Information?

It's free—and easy to get. Simply note here the items on which you want more details, then turn to the Reader Service Section inside the back cover, where all are listed by pages and by subjects under, "Editorial: New Equipment, Supplies"—each one with a page key number after it. The key numbers also appear on the handy Reader Service postcard. So you circle those for the items that interest you, sign at the bottom, and mail. No postage is needed.

"Need a big talking point? try **Vitamin A!"**

IT'S often surprising what one good new "talking point" can do to a sales curve. If *yours* could stand improvement, it will pay you to look into the possibilities of enriching your product with DPi Vitamin A.

Like many others, you may find that this taste-free, odor-free natural concentrate has the right appeal on your label to put new life into an old product.

Or you may find that Myvax 16 Synthetic Vitamin A Palmitate with its unique stability permits foods to be A-enriched that couldn't be till now.

Let's talk about *your* product and vitamin A. It could be a mighty profitable conversation—for *you!* To arrange a date with the world's foremost specialists in vitamin A, simply write to ***Distillation Products Industries,*** 723 Ridge Road West, Rochester 3, N. Y. (Division of Eastman Kodak Company). Sales offices: 570 Lexington Avenue, New York 22, N. Y. • 919 N. Michigan Avenue, Chicago 11, Ill. • W. M. Gillies & Company, Los Angeles and San Francisco • Charles Albert Smith Ltd., Montreal and Toronto.

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leaders in research and production of both natural and synthetic vitamin A

Also . . . high vacuum equipment . . . distilled monoglycerides . . . more than 3400 Eastman Organic Chemicals for science and industry

Non-Indicating Controller With "Lock Up" Feature

Only the man with the key can get in to regulate the control on this non-indicating controller for temperature-pressure. New unit incorporates a lock on cover of instrument for "locking in" control point settings.

Locking device eliminates financial, labor and time losses that might be caused by unauthorized persons wilfully or accidently changing control point settings. It is expected to prove especially valuable in dairy, canning, refrigeration, vegetable oil refining, and other industries where it is essential that setting remains unchanged.

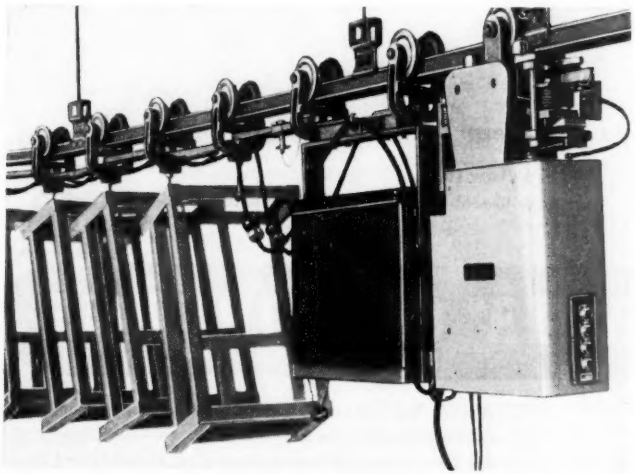
In new design, control-setting mechanism is a slot-tipped spindle inside the locked cover. Adjustment is made by unlocking and removing cover, inserting a screwdriver in slot of spindle, and turning in desired direction. Once set, cover is replaced and control is literally locked-in, with only processing foreman or appropriate engineer having access. Previously, a knob located on outside of case was used for regulation.

Lock is conveniently situated at middle right side of case to line up with a bar mounted horizontally on inside. Cover is lined with a rubber gasket, making instrument dust and weather proof. Small in size yet sturdy in construction, this controller is durable and well suited to many automatic control applications.

Known as Model 8352, Type 1, instrument is available for either direct or reverse acting control applications and operates on same principle as previous TAG model. It measures 5¾ in. by 7¼ in.—*Tagliabue Instrument Div., Weston Electrical Instrument Corp., Newark 5, N. J.*

Circle 121A on Reader Service Card

Overhead Conveyor System Is Battery-Powered



No outside source of energy is required to run this powered overhead conveyor that uses its own batteries.

Called Mono-Dyne, the nature of design is such that it can be incorporated into present manually operated systems, thereby making them power operated at a comparatively low cost. And further savings are claimed, since the need for complicated overhead wiring is eliminated.

Capable of multi-speeds, forward and reverse, the unit is operated by either handy pushbutton or remote control. It is stated to perform equally well indoors or outdoors, and it is capable of ascending grades.

Mono-Dyne systems may be used for production line conveying, materials handling, and for the general movement of goods within a building or between buildings.—*The Bloom System, Inc.*, 19431 *W. Davison Ave., Detroit* 23.

Circle 121B on Reader Service Card

Keep better TASTE BETTER..

thanks to Cellophane!

Overwrap of tough Sylvania Cellophane MS-5 in the 300 gauge keeps cookies crisp longer.

5 important properties that mean successful bakery packaging:

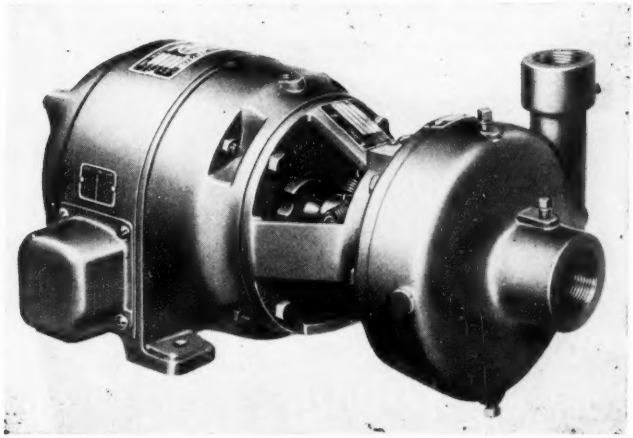
★ Low cost ★ Easy application
★ Durability ★ Grease protection
★ Moisture protection

Sylvania is always ready to help you make the most of your cellophane supply. Discuss this problem with your Sylvania representative or write us concerning your application. Address: Market Development, Dept. F-10.

SYLVANIA® CELLOPHANE

SYLVANIA DIVISION AMERICAN VISCOSE CORPORATION
Manufacturers of cellophane and other cellulose products since 1929
General Sales Office: 1617 Pennsylvania Blvd., Philadelphia 3, Pa.

Pump Has Stainless Steel Contact Surfaces



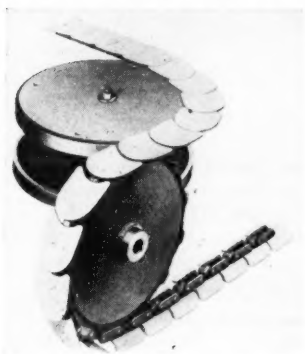
All wetted parts of this small centrifugal pump are constructed of Type 316 stainless steel.

Pump's discharge ranges from ¾ in. to 1½ in.; power from ¼ hp., 1,750 rpm. to 2 hp., 3,450 rpm. Unit has all features of regular line of B & G Series "1522" centrifugal pumps, including a leak-proof mechanical Teflon seal, standard motor, hydraulically balanced impeller, and spring-type flexible coupling. Unit is easily serviced. Removal of a few bolts permits separation into three parts.

Pumps are carried in stock.—*Bell & Gossett Co., Morton Grove, Ill.*

Circle 123A on Reader Service Card

Tip-Free Carrier Bends Horizontally, Vertically



This new flat-top conveyor flexes in two planes—horizontal and vertical. Further, it can curve around corners having a radius as little as 6 in.

Known as FlexTop, it is designed primarily for tip-free conveying of bottles, jars, packages or small parts. Big advantage reported is that it eliminates necessity of transfer points in the conveyor system. It also is stated to curb danger of containers being chipped, tripped or otherwise damaged as they move from one chain or one conveyor to another.

Conveyor can be driven from one power source (within limits of chain loading), eliminating the need for transmission parts at transfer points—an added advantage seen resulting in savings both in first and operation costs.

Conveyor consists of carbon or stainless steel crescent-shaped top plates (see photo) mounted on links connected by a specially designed universal joint. Top plates are induction-welded to the chain links. Chain operates over special cut-tooth sprockets.

There are horizontal idler disks, 14 in. in dia., at corners. Two disks are used at each corner, one for the carrying strand and one for the returning strand.

Speed of chain is determined by product being handled and by length of conveyor.—*Chain Belt Co.*, 1600 *West Bruce St. Milwaukee 4, Wis.*

Circle 123B on Reader Service Card

Bulb Dispels Odors; Ozone Tripled

A tiny lamp that dissipates odors through a triple output of ozone-inducing radiations has been developed.

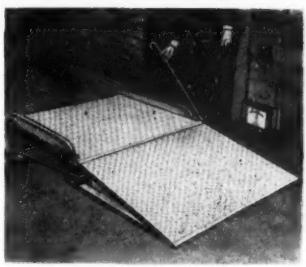
Termed three times as powerful as the lamp introduced in 1945, the new "Odorout" bulb is stated to change odor molecules in air instantly. This occurs as ultraviolet radiations of special wave length transform the oxygen around the lamp into ozone, an air purifier.

When burned in a special wall fixture, the 3½w., walnut-sized lamp destroys odors of cooking, smoking, dampness, mildew and perspiration.

New lamp was developed by F. H. Rixton, a company engineer, as a "by-product" of a study involving lamp starting. Not only was starting simplified but also the amount of ozone-inducing radiations was multiplied. Selection of a glass bulb to transmit more ultraviolet completed the job.

Bulb's life is put at six months when operated 24 hr. a day. It must be burned in a special fixture with a transformer-type current-controlling device.—*Westinghouse Electric Corp., 306 Fourth Ave., Pittsburgh 30.*

Circle 123C on Reader Service Card



Dock Board Slippage Curbed by Lock Unit

Incorporated into the ramp section of this lightweight, magnesium dock board and ramp combination is a new drop lock. It automatically falls into place against the dock, securely holding the unit in position during loading.

Locking action is positive, says maker, to avert any possibility of board slippage. Combinations that are complete with the new automatic drop lock have been specially designed for use in overcoming extreme height differences between dock and car.—*Magline, Inc., Pinconning, Mich.*

Circle 123D on Reader Service Card

MEAT PACKER SAVES $80,000

CANNER REPORTS 27% SAVING

FRENCH DRESSING BOTTLER SAVES $3,200

KETCHUP MFR. REPORTS 38% SAVING

COLD FIGURES

prove that hundreds of food processors have

CUT SEASONING COSTS 20%–40%

through the use of

MAGNA Spice CONCENTROLS®

THE MM&R BRAND OF SPICE ESSENTIAL OILS

No wishful thinking this! Readily-substantiated figures *prove* that hundreds of food processors are slicing thousands of dollars off their seasoning costs *annually* through the use of concentrated, *natural* MAGNA Spice CONCENTROLS. These *facts* tell you why MAGNA CONCENTROLS *must* save you money!

FACT ♦ *Because they are pure, carrier-free seasoning all the way through, MAGNA CONCENTROLS must cost you less per batch!*

FACT ♦ *Because they reduce bulk to a minimum, they must give you maximum economy in shipping, storing, handling.*

And since you *yourself* add the basic spice oil to your product, you achieve complete *in-plant* control of seasoning uniformity. May we show you how you can obtain *all* these advantages without changing the flavor of your products? Let the MM&R Food Technology Dept. duplicate your present spice formulae *precisely*—with a guaranteed saving of 20%-40%! Inquire today!

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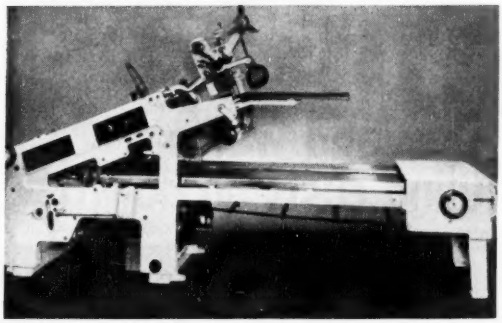
MAGNUS, MABEE & REYNARD, INC.

SINCE 1895 . . . ONE OF THE WORLD'S GREATEST SUPPLIERS OF ESSENTIAL OILS

16 DESBROSSES STREET, NEW YORK 13, N. Y. • 221 NORTH LASALLE STREET, CHICAGO 1, ILL.

LOS ANGELES: BRAUN CORP. • SEATTLE, PORTLAND, SPOKANE: VAN WATERS & ROGERS, INC. • SAN FRANCISCO: BRAUN-KNECHT-HEIMANN CO.

Wraps Cookies, Sandwiches, 40 Packages a Minute



This machine, known as the Model U-6, will wrap a sandwich in cellophane without the necessity of using a card. It will also wrap small pies and cookies placed on a flat card or a card with upturned ends.

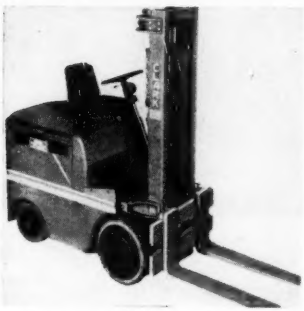
Machine requires only one handwheel adjustment for the length of the product. Height and width are automatically taken care of by a self-measuring paper feed. Hence, two or even three stacked sandwiches can be wrapped as a single unit, if desired. Machine has a speed of approximately 40 packages per minute.

Unit can also be equipped with a top-labeler that automatically imprints labels in roll form with any desired message. This device cuts the labels from the roll and seals them to tops of packages.

Machine is especially designed to permit easy cleaning. It is provided with safeguards for the protection of the operator.—*Package Machinery Co., East Longmeadow P. O., Springfield, Mass.*

Circle 125A on Reader Service Card

Truck Operation Made Simpler, Safer



New features incorporated in the electric Carloader are claimed to provide easier operation, greater safety and improved maneuverability.

Operation is simplified by mounting fingertip control lever on steering column. This makes possible the selection of direction of travel and the engagement of the first point of power simultaneously.

Automatic acceleration eliminates jerky movement. Shifts from one point of power to another are timed automatically in accordance with torque requirements.

Steering is made easier by means of the "no-kick-back" steering axle pivoted on rubber torsional bearings.

An added factor of safety is provided by a "deadman" brake linked to driver's seat and operating off shaft of drive motor. Brake is set automatically the instant the driver's seat is unoccupied.

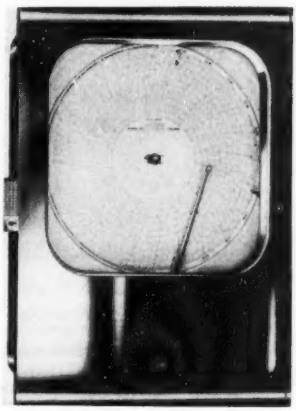
Improved design of these late models provides for greater maneuverability because of the smaller turning radius.

Battery compartment has been redesigned for greater convenience. Top cover is hinged at center to permit charging and servicing battery without removal from truck.

Standard equipment includes cushion tires and a cushion seat with backrest. Model 4024 has a 4,000-lb. capacity. Dimensional specifications with lead acid battery are: Overall length, less forks, 76¾ in.; overall width, 41 in.; wheelbase, 44 in.; outside turning radius, 74 in.; minimum intersecting aisle, 66½ in.; and service weight, less batteries, 5,990 lb.

Model 5024 has a capacity of 5,000 lb. Dimensional specifications with lead acid battery are: Overall length, less forks, 78 in.; overall width, 41-in.; wheelbase, 48 in.; outside turning radius, 78 in.; minimum intersecting aisle, 68¼ in.; and service weight, less batteries, 6,368 lb.—*Clark Equipment Co., Industrial Truck Div., Battle Creek, Mich.*

Circle 125B on Reader Service Card



Running-Time Recorder Is Simple to Read

This new recorder magnifies running-time in such a way that total operating time of production machinery and similar equipment is easily gaged.

"On"-time totals for a given period are recorded on the chart record in hours, minutes, and seconds. "Time-off" periods are also shown, as well as the time at which they occurred.

Recorders are furnished in models suitable for wall or portable use.—*The Bristol Co., Waterbury, Conn.*

Circle 125C on Reader Service Card

Get a dependable DODGE "Job-Rated" TRUCK ...and watch hauling costs go down!

There's just one *sure* way to lower hauling costs . . . and that is to get a truck that's *designed especially for your job!*

That's why a Dodge "*Job-Rated*" truck is your best bet. You can be certain that there's a model that fits your hauling operation to a "T"!

You get more power than ever in new Dodge "*Job-Rated*" trucks, too. It's economical power from a high-compression engine designed to get more energy out of every drop of fuel. It's power that makes it a cinch to haul the *bigger* payloads you can carry on a Dodge.

You also get better-than-ever maneuverability—to make driving easier and safer. You'll make better time in traffic. And, because of new lower loading heights, your drivers will save time at each stop!

There's famous Dodge *dependability*, too—final assurance of lower upkeep and operating costs, year after year.

But why not see for yourself? Pay a visit to your nearby Dodge dealer—real soon!

How Dodge trucks are "*Job-Rated*" for hauling foods

A Dodge "*Job-Rated*" truck is engineered *at the factory* to fit a specific job . . . save you money . . . last longer.

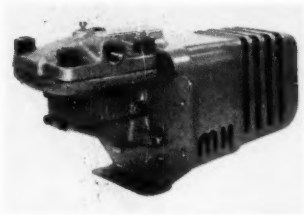
Every unit from engine to rear axle is "*Job-Rated*"—factory-engineered to haul a specific load over the roads you travel and at the speeds you require.

Every unit that SUPPORTS the load—frame, axles, springs, wheels, tires, and others—is engineered right to provide the strength and capacity needed.

Every unit that MOVES the load—engine, clutch, transmission, propeller shaft, rear axle, and others—is engineered right to meet a particular operating condition.

"Job-Rated" TRUCKS DO THE MOST FOR YOU

New Transmitter Stresses Sensitive Control



A compact and lightweight transmitter has been developed for more sensitive measurement and regulation of fluid flows in many industrial processes.

New unit, called a Differential Converter, has a continuously adjustable range from 0-20 to 0-200 in. of water (differential pressure) and provides this 10-to-1 change of range with no change of parts. Field calibration of any range is possible by the use of scale-type weights that eliminate the need for a water column.

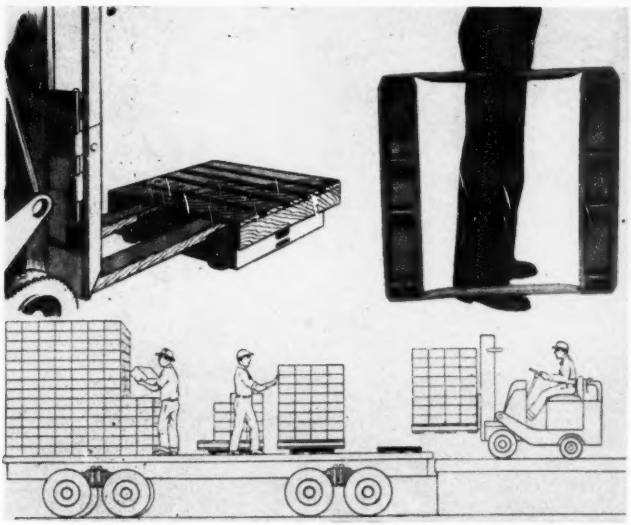
Operating on the pneumatic-balance principle without mercury, the unit employs an accurate weigh-beam system in which the differential pressure, due to fluid flow at the metering orifice, is continuously balanced by a pneumatic pressure. This pressure becomes a measure of the fluid flow as it activates a recording or controlling instrument. Extremely fast response to rapid changes in flow is the prime feature claimed.

Body of the unit is available in either a 750 or 1,500 psi. rating in forged Type 316 stainless steel or carbon steel. Volume displacement in the meter is said to be so small that seal pots or condensing chambers can be eliminated in most installations and the amount of purges, where required, greatly reduced.

Permitting location close to orifice connections, usually without seal pots, the unit is reported to provide considerable savings in installation and maintenance. — *Minneapolis-Honeywell Regulator Co., Brown Instruments Div., Philadelphia 44.*

Circle 127A on Reader Service Card

Dolly Eases Movement of Palletized Loads



Handling time is cut and damage to merchandise and floor surfaces lessened with this new, practical dolly.

Unit is designed for easy manual moving of palletized loads to a position where fork trucks can operate safely and efficiently. Dolly is particularly suited for employment where condition of flooring, car, or truck bed will not support the combined weight of a load and fork truck.

Dolly also permits ready transfer of loaded pallets from end of assembly line, thus preventing production-line slow downs waiting for a fork truck.

Recommended number of rollers varies from 6 to 10, depending upon load and floor. Number of rollers, plus high roller concentricity and use of large diameter, full ball bearing hubs assure easy operation on uneven as well as smooth floors. Unit is light in weight and handy to carry. It is constructed of strong tubular pressed steel.

Standard sizes range from 30-in. x 30-in. to 48-in. x 48-in. Units may be ordered for immediate delivery.— *Roll-Rite Corp., 801 Jefferson St., Oakland 7, Calif.*

Circle 127B on Reader Service Card

Safety-Step Ladder Reduces Accidents

When the weight of the stock clerk is on this ladder, especially designed for use with stock carts, the casters automatically retract, putting two rubber tipped legs into firm contact with the floor.

This action, maker states, tends to prevent rolling action of either ladder or cart, when supporting a person's weight. Thus accidents are minimized and unloading time speeded.

Four-step ladder has hangers that are adjustable for push bar heights of 30- to 38-in., and it is mounted on ball bearing casters for easy movement without lifting. Construction is all steel, with ¾ in. steel tubing frame and expanded-steel non-slip steps, welded for maximum strength and long life.—*Ballymore Co., Wayne, Pa.*

Circle 127C on Reader Service Card

ARTIST: HANS MOLLER

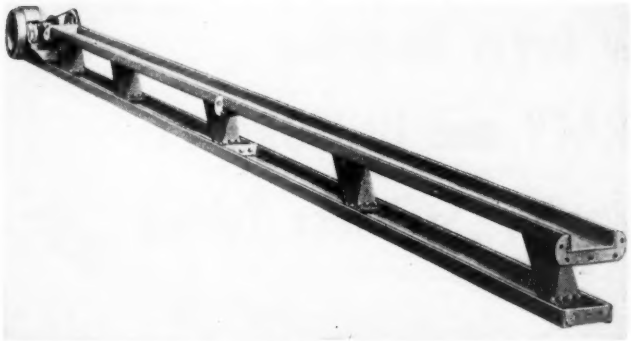
GREAT IDEAS OF WESTERN MAN . . . ONE OF A SERIES

THOMAS JEFFERSON *on truth and a free press* (LETTER TO GEORGE WASHINGTON, 1792

No government ought to be without censors; and where the press is free, no one ever will. If virtuous, it need not fear the fair operation of attack and defense. Nature has given to man no other means of sifting out the truth, either in religion, law, or politics.

CONTAINER CORPORATION OF AMERICA

Sanitation Stressed In Oscillating Conveyor



A great variety of loose bulk foods can be handled by this oscillating-trough conveyor. And construction of the unit is stated to be excellent for handling foodstuffs, especially seeking to avert contamination or corrosion. Escape of dust or gases can be eliminated by addition of a metal cover with flexible connections at loading and discharging points.

Called Flexmount, its design features the use of a one-piece metal trough with high sides, supported on simple one-piece flexible members that function as springs in absorbing energy of trough movement at each end of stroke.

Conveyor trough is normally 4-in. deep and can be furnished in standard widths (8 to 24 in.) in No. 10 or 12 gage steel, stainless or corrosion resisting steel, or other special material. Motion is imparted to trough by a roller-bearing, constant-stroke eccentric.

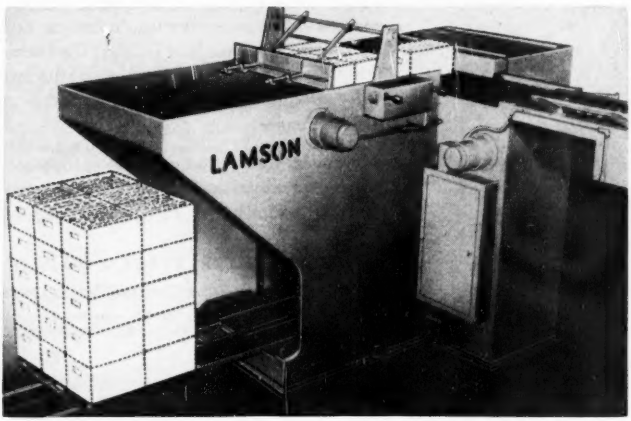
Uniform, continuous flow of material is assured, regardless of overloads or surges. Handling action is stated to be so gentle that there is no degradation of thin or brittle material.

Trough oscillates at its own natural frequency, thus reducing reaction forces on drive to a minimum, and so unit requires only the horsepower necessary to convey material.

Compact unit can be furnished in lengths up to 100 ft., and dividers can be installed to convey several materials simultaneously.—*Link-Belt Co., 307 N. Michigan Ave., Chicago 1.*

Circle 129A on Reader Service Card

Automatic Loader Handles 36-In.-Wide Pallets



Processors, such as bottlers, who use 36-in-wide pallets can avail themselves of time and labor saving advantages of mechanized pallet loading with this new automatic machine.

Designed to eliminate manual pallet loading in mass production, electromechanical devices on the loader position and push cartons or cases (previously conveyed to the top of the loader) onto pallets. Not only does the machine spot alternate containers for best pallet arrangement, but when more than one size container is in production, the machine automatically positions intermittent predetermined pallet lots so that each is stacked properly.

Loaded pallets leave the machine by roller gravity conveyor. They are picked up by fork trucks and transported to storage or directly onto carriers. When used in bottling plants, the automatic loader handles both "flat" and full size cases.—*Lamson Corp., Syracuse, N. Y.*

Circle 129B on Reader Service Card

New Vertical Motors Operate Quietly

Featuring standardized mounting dimensions and quiet operation, new vertical, solid-shaft capacitor motors are available in ratings from ¾ to 5 hp.

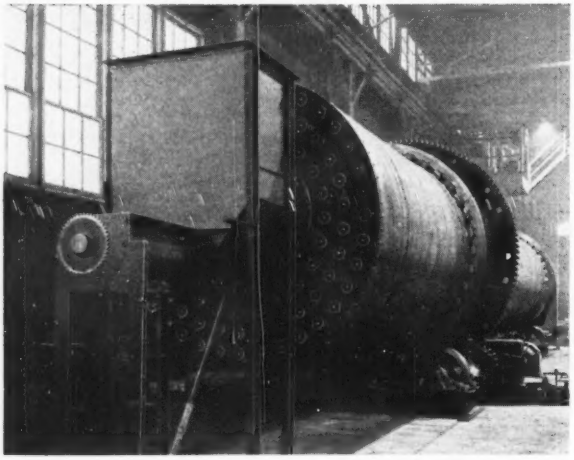
Principal application of these integral-horsepower, single-phase units is on jet pumps and other assemblies for supplying water. Normally furnished as part of complete pumps, motors are suitable for outdoor operation where severe climatic conditions are not encountered.

General-Electric's standard "Tri-Clad" construction provides motors with protection from physical damage, electrical breakdown, and operating wear and tear. Dimensions of Type P base, machined to NEMA standards, are the same as those of polyphase motors of the same size, permitting interchangeability without modification of mounting. Capacitor motors are equipped with squirrel cage rotors, eliminating the need for brushes or commutators.

For use with new motors in ratings of 2 hp, or less, is an automatic thermal protective device that disconnects motor from line when the limiting temperature, for assured safe operation, is reached.—*General Electric, Schenectady, N. Y.*

Circle 129C on Reader Service Card

New Dryer Requires the ACCURACY and UNIFORMITY of *Carpenter* Stainless Tubing



Modern food process equipment like this rotary steam-tube dryer has to *stay on the job.* You can't afford to interrupt a process for hours or days to replace tubes.

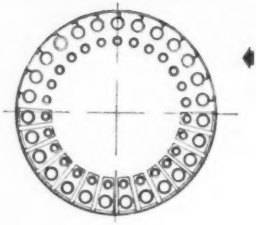
That's why—after considering several sources — this manufacturer's orders call for Carpenter Stainless Tubing. He knows that the quality standards we set at the mill will safeguard the quality reputation of his equipment.

Wherever food products are processed, Carpenter Stainless Tubing is used to safeguard product purity and product quality.

THE CARPENTER STEEL COMPANY

Alloy Tube Division, Union, N. J.

Export Dept.: The Carpenter Steel Company, Reading, Pa.—"CARSTEELCO"



Cross-section view shows how Carpenter Stainless Tubing is arranged in concentric circles. Tubes in the inner circle are smaller diameter than outer tubes, to provide clearance and prevent lumps of material from wedging between tubes.

Carpenter

STAINLESS TUBING

—guaranteed on every shipment

THE U.S. NEEDS YOUR STEEL SCRAP NOW

Smaller Fibers Improve Insulation Material

Uniformity, smoothness, and additional resilience—giving lower conductivity and better performance—are reported for an improved Fiberglas insulation employed in refrigerated equipment.

Designated as the "500" series, it has been used in the field on a limited experimental basis since late 1949. Proving to have a number of important advantages, this material will replace the PF-611, PF-612, and PF-613 insulation in the former "600" series.

This Fiberglas was made possible through the development of advanced production equipment that enabled fiber sizes to be reduced.

Comparing the new series, at 75 deg. F. mean temperature, with the former "600" series: The new PF-511 material (2-lb./ cu. ft.) has a K factor of .250, while the former PF-611 (2-lb./cu. ft.) K factor was .260; PF-512 (2½-lb./cu. ft.) has a K factor of .240, while PF-612 (2½-lb./cu. ft.) had a K factor of .250; and PF-513 (4-lb./cu. ft.) has a K factor of .225, while PF-613 (3¼-lb./cu. ft.) had a K factor of .240.

Remaining in the line in the "600" series will be the 614, 615, and 617 materials, which are primarily used for sound deadening and load bearing. The new insulation became available on Aug. 1 for general distribution in the refrigerated equipment field.—*Armstrong Cork Co., Lancaster, Pa.*

Circle 131A on Reader Service Card

New Boil-Proof Glue Can be Stored 1 Yr.

A new low-cost resorcin-phenol adhesive which meets military specification MIL-A-379A (formerly JAN-A-397) has been developed.

New product, called Casophen LT-68, is an improved modification of Casophen LT-67. The latter, described as first commercial boil-proof glue that could be cured at intermediate temperatures, was brought out in 1942.

Big advantage claimed for LT-68 is that it can be stored for a full year without sacrificing any of its working properties or the quality of the bond. In contract, LT-67 had a storage life of only six weeks.

New material is seen enabling manufacturers of defense materials to stretch hard-to-get resorcin supplies, since the glue contains less than 20 percent of this ingredient.

The bond is termed completely resistant to boiling and outdoor exposures.—*The Borden Co., 350 Madison Ave., New York City 17.*

Circle 131B on Reader Service Card

Extra Thin Electrical Tape Is Strong Waterproof

Multiple advantages are reported for a new type electrical tape made with Koroseal material. Among the virtues of the new product, according to maker, are the following:

Non-transferring, the adhesive can be pressed onto a dry surface innumerable times without losing its stickiness. It will not lost its tackiness or ability to adhere, sticking snugly and securely to itself and insulation around copper wire.

Stated to have a dielectric strength of 8000v., tape is waterproof, highly abrasion resistant and flameproof, resistant to acids, oils, alkalies, and corrosive salts.

Tape is extra thin, hence takes up less room in junction boxes, and other tight quarters. It stretches and conforms readily to irregular surfaces.

Rolls 60 ft. long, ¾ in. wide, and .007 in. thick, come in easy-to-carry metal containers. Special shop carton holds 12 containers.—*B. F. Goodrich Co., Akron, Ohio.*

Circle 131C on Reader Service Card

Color-Stripe Test Paper Tells Milk Freshness

Anyone can quickly detect a milk that is no longer fresh with the use of a new pH strip-test paper. Indicator stripe and six comparative test colors are on each strip of paper.

In use, the paper is dipped into the well-mixed milk for about 5 sec. On removal, the excess drops are shaken off and the indicator stripe is promptly compared with the stripes of standard colors on the paper. Intermediate values are estimated.

Oxyphen testing paper No. 5766, as it is designated, is standardized with milk of accurate pH, using a special indicator (Merck) designed for the testing of milk.

Fresh milk is slightly acid—.12 to .18 percent apparent acidity, or a pH of 6.9 to 6.4 (neutral point on the pH scale is 7.0). Whereas titration of milk gages amount of acidity, pH measures intensity of acidity. However, there is a fairly close relationship between the two. In cases where the milk is rich in protein and ash (which have high buffer capacities), the pH is somewhat affected.

Knowing the acidity of milk is most important in the case of pasteurization. A higher acidity than .18 percent usually indicates an increase due to lactic acid fermentation of milk; while above .18 percent, or lower than pH 6.3, is regarded as the borderline for pasteurization. Raw milk arriving at the pasteurizing plant at this stage is usually rejected, in order to avoid bottling a milk that is close to becoming sour. Under pH 6.0, or acidity of .24 percent, the milk curdles when boiled.

Main use of the Oxyphen pH testing paper is for rapid detection of a milk that is no longer fresh and deviates from the normal. The milk is then subjected to confirmatory tests, such as acid titration, odor, taste, boiling, etc.—*J. Einstein Co., 108-03 Queens Blvd., Forest Hills, N. Y.*

Circle 131D on Reader Service Card

New Chemicals

Temporary Bactericide Protects Fruit Flavor

Loss of flavor and deterioration caused by microorganism contamination of fruits and vegetables are said to be reduced by use of peracetic acid, a new bactericide-fungicide.

It has been reported effective in fighting mold growth in tomatoes through two- and three-day holding periods. And large scale field tests have shown strikingly increased juice yields from treated as compared with untreated tomatoes, by virtue of reduced cutting.

An aliphatic peracid of structure CH_3COOOH, peracetic acid combines the active oxygen characteristics of a peroxide within the molecule of acetic acid. It is stated to exhibit superior bactericidal activity over hydrogen peroxide and acetic acid, and is termed highly effective against spore-forming organisms.

A temporary bactericide, it ultimately decomposes into acetic acid and water—non-toxic and free-rinsing products. Water washing preceding processing readily removes the latter, as well as any freely soluble peracetic acid which may remain. Treatment costs are reported low.—*Buffalo Electro-Chemical Co., Buffalo 7, N. Y.*

Circle 131E on Reader Service Card

In Behalf of Progress . . .

The Engineering Manpower Crisis—and You

Take a look around you—in your office, plant, laboratory and the public square. How much do you see that is not a product of the engineering or scientific mind?

Then visualize the implements and materials employed in argiculture, fishing, mining, lumbering and transportation.

Now consider the weapons, ammunition and instruments needed for the defense of democracy.

Put these pictures into one panorama, and you can readily appreciate the tremendous and essential contributions of the technically trained mind to our daily living and to our security—to our existence, in fact, as a free nation.

Take into consideration, too, this situation: With a long period of military preparedness ahead of us, it is essential to maintain a strong civilian economy. It takes the national income from a high-level "butter" economy to buy guns.

And reflect further on the scientific and engineering nature of the art of war. It takes a lot of technical manpower in the factories, not only to win a war but to minimize the loss of American lives in each skirmish or battle.

It then becomes evident that our ship of state is built upon a solid keel of science and engineering; that we must maintain an adequate force of technical men in our civilian operations.

And get ready for a shock. Although we needed 95,000 additional engineers this year—80,000 for civilian purposes and 15,000 for the military—only 38,000 were graduated last June.

Worse, less than 22,000 will become available next year. And from then on to 1960, the number will be still smaller, not counting withdrawals for the armed forces.

It is disquietingly significant that, in less than 2 years, young men of 18½ years of age will be the sole supply of manpower from which to maintain the armed forces at the 3½ million level. Which means that all able-bodied male technical graduates will be sidetracked for military service.

There you have the disturbing picture of the crisis in engineering manpower—and its the same for all types of technically trained personnel.

This situation is much too serious to be treated lightly. Each of us who appreciates the value of technical know-how—either because we have it or we see it applied in our business operations—should help to get this story across to the public and to individuals and organizations in a position to do something.

The value of the technical man must be explained. People have come to take his achievements—even his near miracles—for granted. And most engineers and scientists are unassuming individuals who are more interested in doing their job than in telling the world about it.

There are two broad steps which must be taken to meet the situation. One is to encourage an increase in the number of technical students. The other is to conserve present and future technical personnel and see that it is utilized to the best advantage of the country.

Talking up the need for, and opportunities of, technically trained men and women will help to increase enrollment of students in technical schools. Publicizing the work and achievements of engineers and scientists in your company or associations will have a constructive effect. If you are an employer, paying technical people what they really are worth—plus proper recognition of their talents—will bring more men into the engineering and scientific field.

With a technical manpower crisis upon us, employers for their own protection better use the incentives of pay and advancement to hold their technical help. Otherwise their ranks will be raided by the defense factories and research laboratories.

Larger food processing firms would do well to institute technical training programs in cooperation with neighboring colleges and universities. And they should consider establishing scientific scholarships for outstanding local high school students, or at least the sons and daughters of employees.

Important as it is to increase the supply of technical personnel, perhaps more good can be accomplished immediately by conserving and effectively utilizing the present supply.

This means, first, that civilian industries and the armed forces should use young engineers and scientists only in positions that require their technical talents. And technicians should be trained and used to do detailed work under the direction of engineers and scientists so as to extend the services of the latter.

But the thing that needs most to be done—and it will meet opposition from uninformed people—is to exempt from the draft all engineers and scientists who follow their profession, except for the number needed in their professional capacities by the military.

One engineer in a defense factory or laboratory may save the lives of hundreds of men on the battlefront.

HOW TO GET

Correct fluid agitation

IN ANY VESSEL

1 Study the pictures at right. Notice how the mixing action improves when the mixer is adjusted to the correct angle.

2 Standardize on LIGHTNIN Mixers. There is a Lightnin Mixer for every food mixing job involving fluids.

Lightnin Portable Mixers swing to any desired mixing position instantly, and lock in place with a turn of the handwheel.

GEAR DRIVE PORTABLE MIXER for viscosities of 500 to 4,000 centipoises. Sizes, ¼ to 3 HP. *Also available:* direct drive portable mixers, variable-speed air driven mixers. More than 30 standard models for every food mixing application.

Other Lightnin advantages are:

Ball bearing motors, prelubricated and permanently sealed.

Extra outboard bearing on mixer shaft to take the load off the motor bearings. This adds years of life to the mixer.

Easy shaft adjustment with thread and taper tube and chuck. No loosening, no jamming.

Under ordinary conditions, Lightnin Mixers run day in and day out, year after year, with lubrication only once a year. Every Lightnin Mixer is *guaranteed* to do the job!

Send today for Catalog B-75 and other helpful literature.

WHEN THE SHAFT is on the centerline of the tank, forces are balanced and a swirl or vortex is created. Desirable for drawing down light powders but inefficient for general mixing.

PUTTING THE SHAFT in this quadrant creates a long swirl without vortex, and with very little top-to-bottom turnover.*

THIS IS THE recommended position. Note heavy top-to-bottom turnover, with the material folding over and blending intimately.*

*Unit illustrated rotates *counterclockwise,* as viewed from above and behind motor. When mixer rotates *clockwise,* the correct position is opposite to that shown.

Lightnin® Mixers

MIXCO® Engineered

Complete Mixing Service for the Food Industries

FOR CLOSED TANKS—Lightnin propeller type top entering agitators from ¼ to 3 HP. Send for Catalog B-78.

FOR HEAVY DUTY MIXING—Lightnin top entering agitators, turbine or paddle type. Sixteen interchangeable speeds in new heavy duty drive. Sizes, 1 to 200 HP. Send for Catalog B-36.

MIXING EQUIPMENT CO., Inc.

(MIXCO)

143 Mt. Read Blvd., Rochester 11, N. Y.

In Canada: William and J. G. Greey, Ltd., Toronto

Please send me the literature checked:

- ☐ B-75 Portable Mixers (Electric and Air Driven)
- ☐ B-78 Top Entering Mixers (Propeller Type)
- ☐ B-36 Condensed Catalog showing complete line
- ☐ Mixing Operations Data Sheet

Name_____ Title_____

Company_____

Address_____

City_____ Zone_____ State_____

BREWS PREPARED from each type of coffee bean used in Martinson blend are checked by Joseph Martinson, Jr., pres.; Jerome Neuman, v.-pres.; and T. Ralph Saint.

EIGHT-STORY Manhattan plant where 1951 coffee line is now housed. All facilities are new.

UNFOLD HERE

What Goes Into A Modern Coffee Plant

Streamlined Facilities Contribute to Economical Operations in High-Cost Area

GOAL IN THE ENGINEERING of Joseph Martinson & Co.'s New York City plant—detailed in accompanying foldout—was "Top-efficient equipment in a top-efficient layout."

Thus the company assured itself of the highest levels of process flexibility and quality control—the factors enabling maintenance of utmost uniformity in its distinctive blend of coffee.

Each type of bean going into the blend (sometimes calling for eight or more varieties) is processed separately. The company uses this unusual procedure in the belief that the particular flavor of a raw coffee can best be brought out through individual roasting—varying the exact time and temperature to suit the type, source, and age of bean.

Samples of green beans are roasted and ground under laboratory conditions for taste testing. The company then purchases only the coffees that will contribute to the blend.

With exception of Brazilian Santos which arrives in both the standard 132-lb. bag, beans are received and stored in 140 lb. burlap bags. When a lot is assigned to processing, the bags are dumped from any of three warehouse floors into floor chutes to one of eight green bean bins—see Point 1 in the diagram. A unique distributing system enables the operator to manipulate a rotary selector (located on each of the three floors) charging the beans to the assigned bin. Each bin has a capacity of 60 bags.

Between chute and bin, the beans are cleaned in an air-separator and rotary screen. The pneumatic unit removes all foreign material lighter than the kernels and the rotary any oversize matter—by dropping the beans through perforations in the screen.

To accurately weigh out 500-lb. roaster charges, an operator, having fed the green bean scale hoppers, then loads the six roasters from either of two weigh stations—Point 3. He can control the bin discharge valves from the stations through a series of linkages.

No-Smoke Operation

Special roasters were installed of the smokeless type that reduces air pollution, which is serious in New York City. Recycling all smoky matter back through the roaster burner, these units have eliminated all signs of smoke.

The roasting cycle requires about 16 min. This includes: Preheating to the 400 deg. F. range, actual roasting, and a water quenching in order to stop or check the color of the roast. They are then cooled to room temperature in air coolers—one for each roaster. A mechanical rake smooths the beans on a perforated deck in the cooler and scrapes them to a floor chute leading to the stoner.

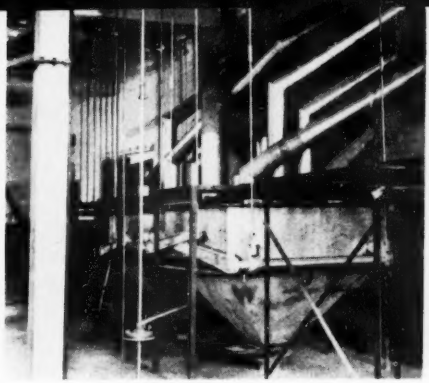
The latter pneumatically lifts the roasted beans to a distributor feeding any of eight roasted-bean bins. Weight of the beans is now about 85% that of the green beans. All material that is heavier remains in the stoner collector at the bottom of the vertical pneumatic lift.

Blending is controlled from a weigh station on the 7th floor—Point 5. The operator, receiving his formula from the chief blender, makes up 3,000-lb. batches at a time, piping the proper amount of each type from the roasted-bean bins into the 3,000-lb. scale hopper. Mixing is effected in rotating horizontal wooden drums. Fitted with special baffles, these turn at a rate of 5½ rpm.

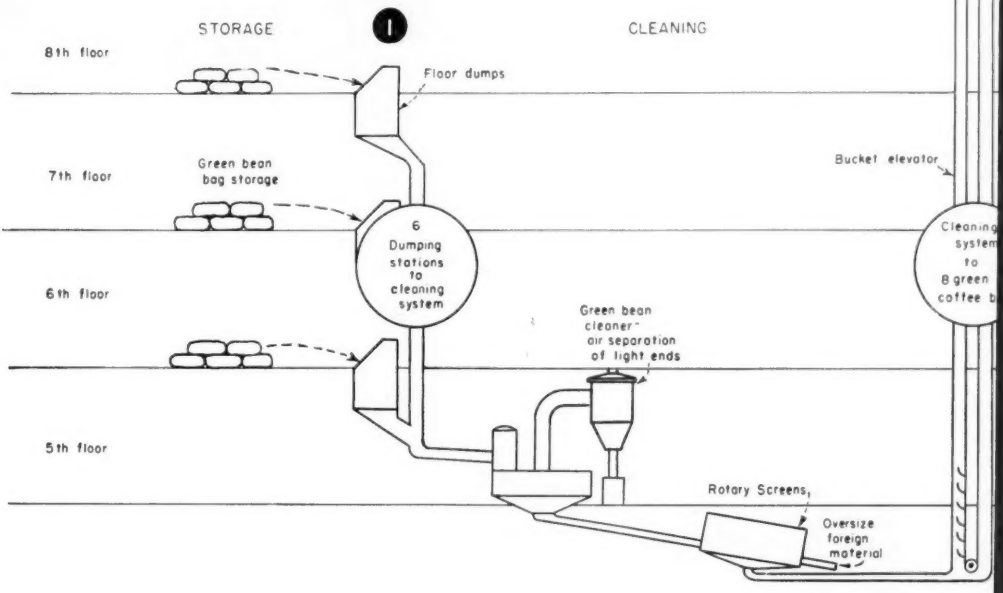
Roller mills grind the blend to specification prior to packaging. Grinds for the retail trade are vacuum-packed in 1-lb. tins, while 1-lb. bags and 4-oz. cellophane containers are put up for restaurants.

Acknowledgment is made to Mr. T. Ralph Saint, of Jabez Burns & Sons, New York City, for details of our flow-sheet. Photos are by Howard Graff and FE staff.

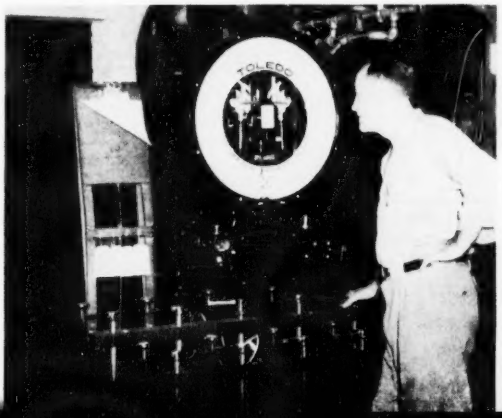
1 **GREEN BEANS** go in floor chutes, are cleaned below, then stored in steel bins (left).



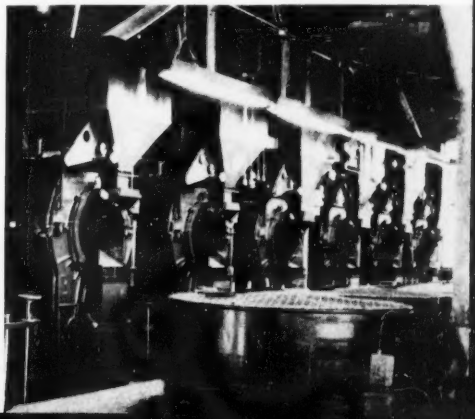
2 **BATCH CHARGES** (500-lb.) are weighed in these suspended hoppers before going to roasters.



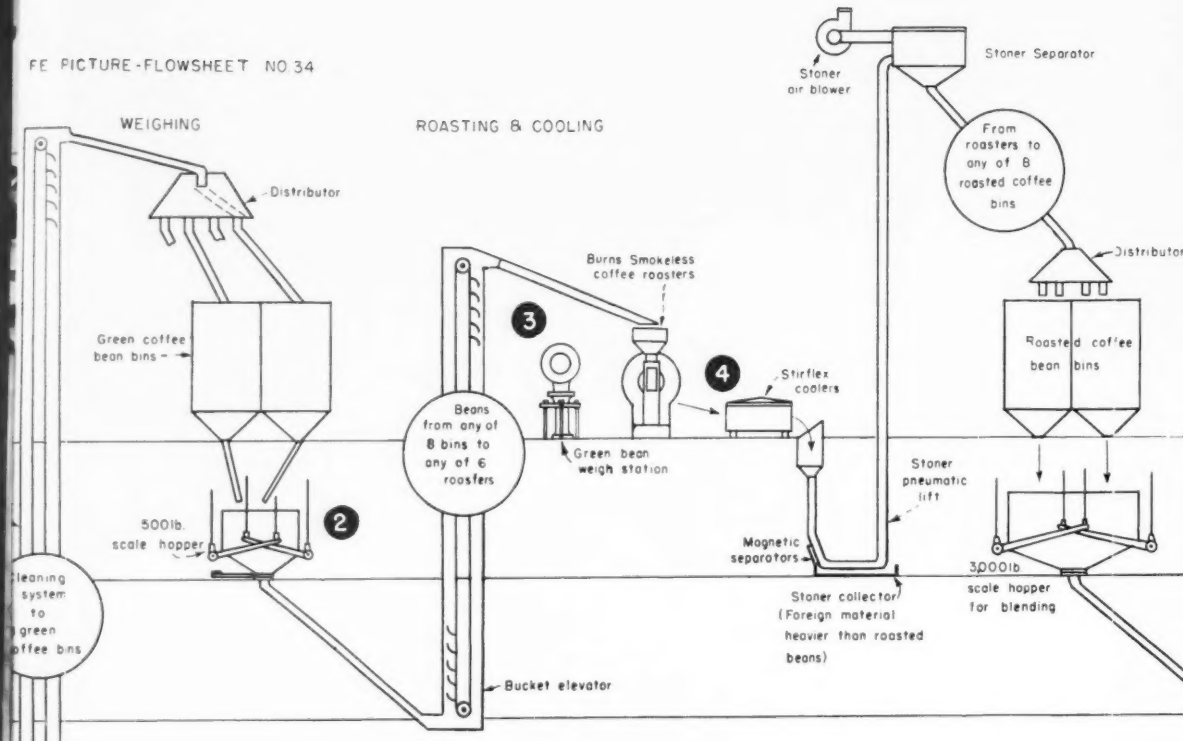
3 **WEIGH-CONTROL** station for bean charges is conveniently located next to row of roasters.



4 **BATTERY** of six Burns smokeless roasters faces equal number of air-cooled bean coolers.

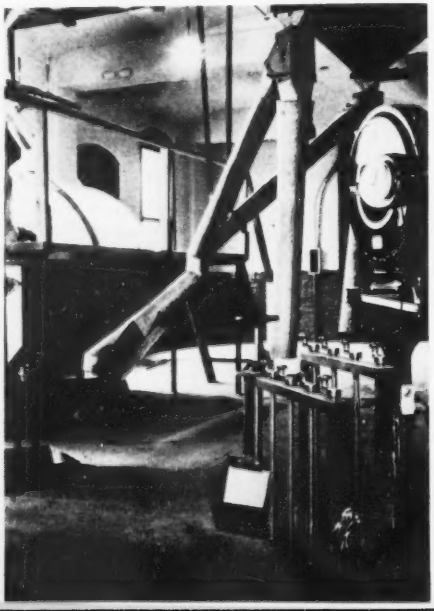


FE PICTURE-FLOWSHEET NO 34

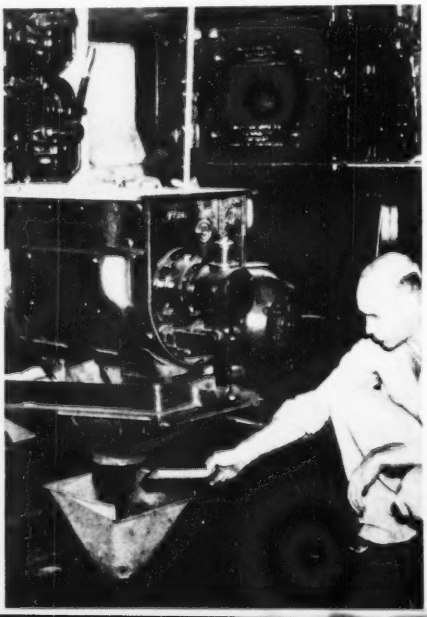


faces an

5 **AFTER** weighing (right), roasted beans are blended (rear) in 3000-lb. lots prior to grinding.



6 **HERE,** blended beans are ground to carefully predetermined sizes in roller-type mills.



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Pneumatic bean c
Rotary screen be
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8-Spout bean dis
Central control st
Green and roaste
Bin indicators—f
Ground coffee Tr
and screw disch
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Stoners (collector
Model 14 compac

Toledo scales
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Rotary wooden b
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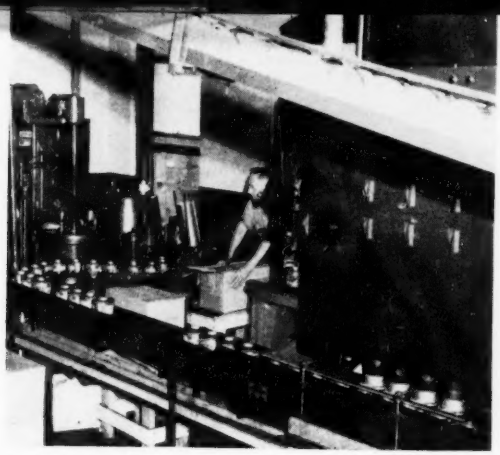
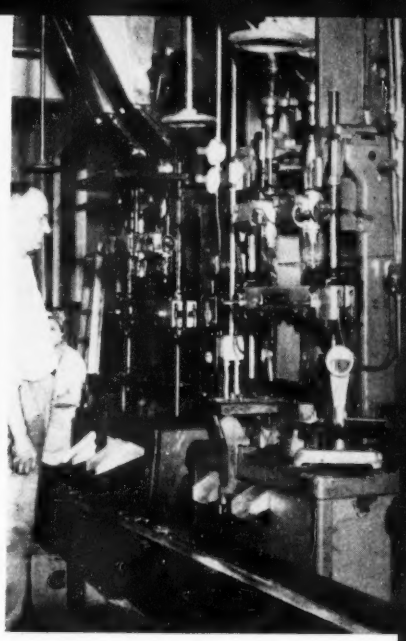
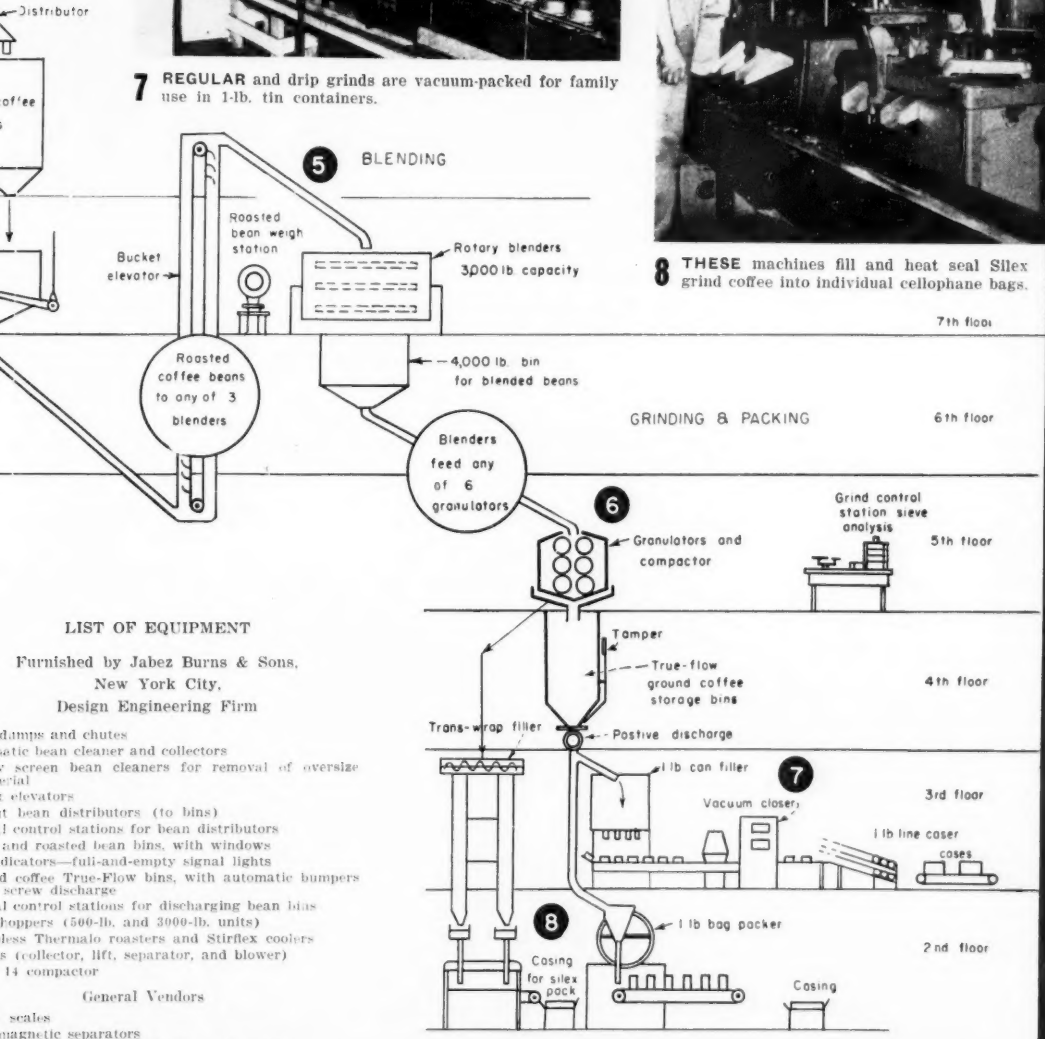
Stokes & Smith T
Gump Bar-Nun
American Can Co
Benj. Bentner &
Burt casers



7 **REGULAR** and drip grinds are vacuum-packed for family use in 1-lb. tin containers.



8 **THESE** machines fill and heat seal Silex grind coffee into individual cellophane bags.



LIST OF EQUIPMENT

Furnished by Jabez Burns & Sons,
New York City,
Design Engineering Firm

damps and chutes
atic bean cleaner and collectors
screen bean cleaners for removal of oversize erial
elevators
t bean distributors (to bins)
l control stations for bean distributors
and roasted bean bins, with windows
dicators—full-and-empty signal lights
d coffee True-Flow bins, with automatic bumpers screw discharge
l control stations for discharging bean bins
Hoppers (500-lb. and 3000-lb. units)
dless Thermalo roasters and Stirflex coolers
s (collector, lift, separator, and blower)
14 compactor

General Vendors

scales
magnetic separators
wooden blenders (Martinson design)
Model 777 and 888 granulators
onn Machine Co. and Stokes & Smith 1-lb. fillers
& Smith Trans-Wrap 4-oz. bag filler and sealers
Bar-Nun 1-lb. bag fillers
an Can Co. vacuum closers and can line
Bentner & Co. Benco bag sealers
asers

COFFEE PROCESSING
From Bean To Package

Century PROTECTED MOTORS

Let You Forget About Atmospheric Hazards

Shown here are four basic types of Century Protected Motors which are designed to resist the dangers of hazardous atmospheres. A properly selected Century motor—with the right protection—is the ideal combination for a long life of satisfactory performance.

1 **Open Protected**—Form J, general purpose motor—meets the needs for most installations where operating conditions are relatively clean and dry. The top half of the motor frame is closed to keep out falling solids or dripping liquids.

2 **Splash Proof Motor**—gives the necessary protection where plants must be washed down—keeps water out of the motor even when a hose is applied directly on the frame. It also provides protection against rain, snow, sleet and ice for outdoor installations.

3 **Totally Enclosed Fan Cooled Motor** — protects against dusts, mist or fog that might be detrimental to the vital parts of the motor. The inner frame protecting the motor is sealed to keep out harmful matter.

4 **Explosion Proof Motor** — protects against atmospheres charged with explosive dusts or gases. They carry Underwriters' label for specific kinds of hazards.

Century builds a complete line of alternating and direct current motors in a wide range of types and kinds—in sizes from 1/6 to 400 horsepower.

Specify Century motors for all your electric power needs.

Century Electric Company is celebrating its 50th year in the electrical industry.

-632

Century C MOTORS

CENTURY ELECTRIC COMPANY 1806 Pine Street • St. Louis 3, Missouri

Offices and Stock Points in Principal Cities

CF

VALVES

piping repairs *cost more* now!

You make fewer of them by using Dependable Quality

CRANE VALVES

...That's why more Crane Valves are used than any other make

Crane No. 351 125-Pound Iron Body Globe Valve

Preferred for true, tight seating

For smooth, positive regulation of flow, check Crane quality engineered Iron Body Globes with composition or metal disc. They're easy to operate; easy to maintain. Guide stem under disc assures square seating ... true disc travel with minimum vibration. Seat rings are screwed in and can be renewed if necessary.

These rugged valves require little maintenance. Roomy stuffing box with bolted two-piece gland keeps tight stem seal, lengthens packing life. Stem threads are outside valve body, easy to lubricate.

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These *Mosaic Tile* properties assure walls and floors that never give *in* to wear and tear; never give *out* during the lifetime of your building. *Mosaic Tile* permits you to meet *all* Food & Drug Administration standards of sanitation. The flint-like surface of *Mosaic Tile* discourages the setting up of bacterial growth—cleans in record time with mop, hose or damp cloth. Alkalis, greases or chemicals will not cause *Mosaic Tile* to discolor, fade or disintegrate! Even most acids do not harm Ceramic Mosaic or Mosaic Carlyle Quarry Floor Tile.

See for yourself how *Mosaic Tile* will enhance the appearance of your plant; increase its sanitation; improve employee morale, and reduce costly overhead. Consult your architect, builder, tile contractor—or write Dept. 25-5, The Mosaic Tile Company, Zanesville, Ohio, for detailed information. Of course, there's no obligation!

Long-wearing, low-maintenance Mosaic Carlyle Quarry Tile floor and Mosaic Tile wall—Missouri Pacific Hospital Kitchen, St. Louis, Missouri. Specifications: Wall—Mosaic Tile, Color, L-216; Floor—Mosaic Carlyle Quarry Tile, Oriental.

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ECKHARD & ZISKE TERRAZZO & TILE CO.
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a new low in maintenance,
specify MOSAIC TILE for . . .
Walls! Floors! Window Sills!

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OFFICES, SHOWROOMS AND WAREHOUSES ACROSS THE NATION. OVER 4000 TILE CONTRACTORS TO SERVE YOU.

Not, PLEASE, In the Name of Fairness

Our national Office of Economic Stabilization has adopted a policy of gearing wages to the cost of living. We are told that "escalator clauses," which provide that rates of pay shall be adjusted to take account of changes in the cost of living, will be generally approved.

If the adoption of this policy had been announced as a frank concession to political expediency, it would have been quite understandable. There may very well be votes, lots of them, in a policy which purports to protect the income of a large group against loss through the price inflation caused by the defense program.

A case might even have been made for a policy of approving escalator clauses on grounds of production expediency. The leaders of some three million organized workers now covered by such clauses have indicated that they would fight to the limit to keep them and thus maintain "real wages," that is, wages measured by their purchasing power. The leaders of other organized groups have indicated they would fight to get the benefit of such clauses. Denial of them might mean serious strikes.

Justified "in Fairness"

However, the policy of approving escalator clauses was not based on these relatively low grounds of expediency. It was justified on high moral grounds, on grounds of "fairness." In the words of the President's Council of Economic Advisers, "maintenance of real wages during inflation cannot in fairness be disallowed."

That proposition is false.

It would be truthful to say, "maintenance of real wages during inflation cannot in fairness be allowed."

The truth of the corrected proposition becomes evident immediately when you take a look at the basic nature of the inflationary problem created by defense mobilization.

We are devoting a large share of our national production to defense. The share is now scheduled to hit about 20% in 1952.

Since we are not able to increase our total production fast enough to meet defense needs

in addition to civilian needs, that means a cut in the supply of goods and services that is available for civilian consumption. But the money paid out for the production of defense materials is added to that which is available to buy civilian goods.

Thus, more money is put into the hands of the people to buy less goods. So prices go up. That is inflation.

If one group of people then is granted enough additional money to offset the price increases — and that is the purpose of an escalator clause — and thus can continue to buy as much as they have been buying right along, less goods will be left for other consumers who are not getting this advantage. That is palpably an unfair distribution of the sacrifices necessitated by defense mobilization. In fairness, therefore, maintenance of real wages in inflation cannot be allowed.

Organized workers were not the first, of course, to get the benefit of an automatic adjustment to take account of the increased cost of living. The farmers got theirs first. The price parity formula is, in essence, an escalator clause. The federal government underwrites increases in the prices of the things farmers sell in order to match increases in the prices of the things they buy.

Crucifying the Helpless

As matters stand, two groups are without benefit of escalator clauses. One group is composed of manufacturing firms. While they have not been nearly as successful as the misleading reports of "record-breaking profits" suggest, they have been able to look after themselves fairly well — thus far.

But one group is completely without protection. It is that numerically large but politically unorganized mass of people — many of them old and relatively helpless — who are trying to live on pensions, annuities and other fixed incomes derived from their savings. They are at the end of the line when the increased costs of inflation are passed along. They have no one to whom they can pass the buck. They are being progressively pauperized by the continuing inflation caused by progressive boosting of costs and hence prices.

With the present line-up of pressure groups in Washington, protection for the principal victims of inflation — those who have saved for a rainy day only to find inflation has blown away the roof — is obviously an extremely difficult business. But to have even temporary insulation against inflation granted to powerful groups in the name of fairness should be offensive to the nostrils of a nation that presumes to assert the moral leadership of the Western World.

The only really fair way to handle inflation is to prevent it. But once it is under way, fairness demands that the burdens be as evenly distributed as practicable.

An escalator clause — or a farm parity provision — is explicitly a device to enable the group favored by it to escape the burden of inflation. Whatever concessions we feel we must make to political pressures or production expediency, let us at least be honest enough not to invoke "fairness" as justification for so arbitrary a discrimination in the distribution of the defense burden.

McGraw-Hill Publishing Co., Inc.

Canned Cream Whip

—How It's Pressure Packed

Product is automatically filled into containers, which go to crimping, gassing and shaking units. Casing follows

THROUGH the recent application of the pressurized container for packaging whipped cream, the consumer now "jets out" her own topping in a trice.

By merely pressing a finger-tip valve on a can of cream charged with nitrous oxide gas, the product is ejected from the container in a fluffy, whipped consistency. In this way, the former tedious, time-consuming job of whipping cream is "built into the container."

The can is filled at the dairy with 6 fl. oz. of cream to which sugar and vanilla are added. Actually, the consumer gets 21 fl. oz., since whipping does not take place until the cream is dispensed.

This new technic calls for drawing a vacuum in a 6-oz. can of cream and pressure-injecting nitrous oxide gas.

To spotlight typical pressurized-container operations, FE editors studied the can lines in two dairies at Hartford, Conn.—plants of Aerated Products Co. and Connecticut Milk Producers Assn.

At Aerated Products, three men pack 38 cases (24 cans per case) per hour of the product, called Instant Whip. Cans, dispensing valves, tips, and caps are washed and sterilized in three vats. One vat contains a soap solution, another water, still another chlorine solution (200 ppm.).

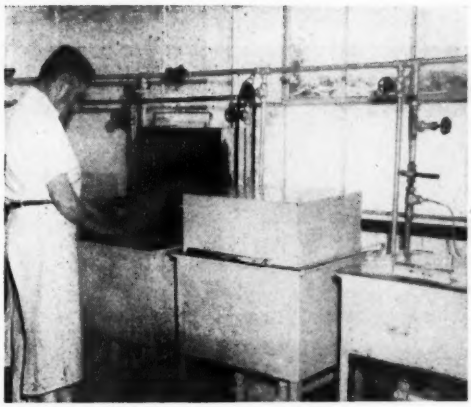
Sterilized cans are fed onto a flat-top chain conveyor that carries them to a paddle-wheel mounted on a vertical spindle. The lower end of the spindle has spokes that actuate an electric relay. In turn, the relay operates a 4-gal. stainless steel, single-spout filling machine that automatically puts 6 fl. oz. of cream into each can. The cream is gravity-fed, going from a 70-gal. stainless steel-lined supply tank through 2-in.-dia. stainless pipe to the filler.

Cans continue on to the crimper, where a dispensing valve with a gas-tight rubber gasket is pneumatically forced into the container under 90-100 psi. Then, at the vacuumizing station, a 2 hp. pump draws about 28½ in. of vacuum in the container. Next, the cans go to the gas-injecting unit, where they are charged with nitrous oxide gas under 150-160 psi.

A polystyrene tip is now slipped over the valve, and a cap is placed over the tip to guard against contamination or release of gas. Finally, the product is agitated and cans are packed into shipping cases.

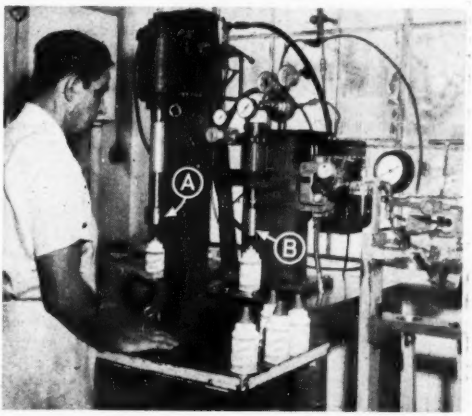
Aerated Products also packages cream in 7-oz. returnable stainless steel-pressurized containers, using a flat cap containing a rubber gasket and valve. Unlike the nonreturnable cans which go to retail stores, these containers are distributed to drug stores, cafeterias, and restaurants.

At Connecticut Milk Producers Assn., five men produce 75 cases (24 6-oz. cans per case) an hour. One man operates a 6-head rotary filling machine, another a 1-head crimper, and still another the gassing operation and shaking machine. The fourth man applies caps to the cans and packs the containers into cases. Cases, caps, and containers are supplied by the fifth worker. This product, Reddi-wip, is processed under franchise from the Reddi-wip Mfg. Co., Inc., of New York.



1 IN THESE tanks, cans, caps, and valves are first washed in soap solution, rinsed in cold water, then sterilized in chlorine solution.

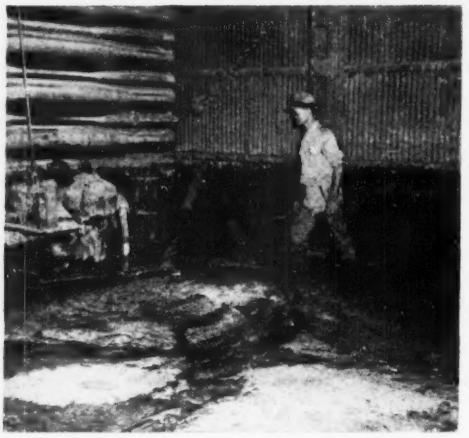
2 CANS are conveyed to automatic machine that fills each one with 6 fl. oz. of cream, containing sugar and vanilla. Operator is seen inserting ejector valves.



3 NEXT, crimper (A) forces gas-tight rubber gasket into can. At gassing station (B), vacuum is then drawn and nitrous oxide gas is injected. Finally cans are shaken.

FOOD STOCKS TOOK A MIGHTY BLOW WHEN

NO SALVAGE in this biscuit-company warehouse. Seen are bursted sacks of flour and ruined package supplies.



WORKER wallows through grain slop that drained out of flood-struck elevator. Also lost was grain in car (left).

Salvaging K. C.'s Flood-Hit Foods

HAVOC wreaked by the recent Kansas City flood included costly damage to food and grain in nearly 2,000 freight cars and in many warehouses and plants.

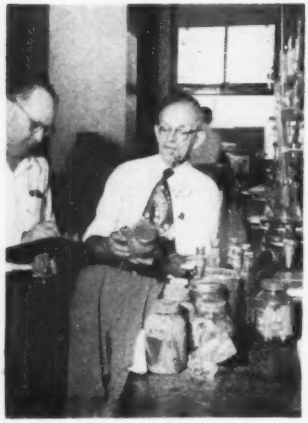
The job of checking, salvaging, and disposing the mass of water-spoiled goods demanded the full-time services of 30 F&DA inspectors.

Except for the hermetically sealed canned and glass-packed foods, packaged goods fared badly. Snap-on and screw-type capped containers failed to keep out contamination.

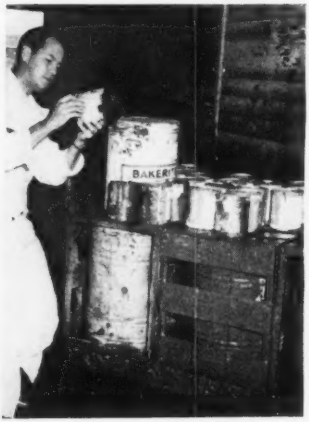
Priority in reclamation went to the high-priced, large-size canned items. Labor requirements precluded salvaging of most small, low-priced canned foods.

Hundreds of sanitary trenches were dug alongside the cars to bury non-salvageable foods. This move took pressure off hard-pushed garbage-disposal services. Some wrecked freight cars were detached from wheels, lifted by crane into landfills, and interred bodily. Bulldozers buzzed about over the burial grounds to re-level the terrain. (Photos by Food & Drug Administration)

F&DA'ers Gage Extent of Food Damage



SNAP-ON and screw-type capped containers were a complete loss. But hermetically sealed ones were Okay.



SIZE of container and value of unit were factors in favor of reclaiming these shortening products.

FLOOD WATERS rose half way up in this freight car. Cases of cereals above water-line were recovered.

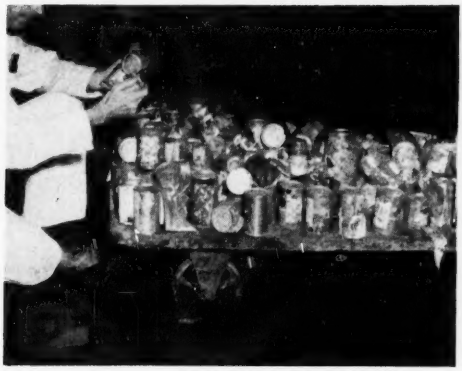
THE MISSOURI POURED INTO KANSAS CITY

HERE, palleted canned goods resisted; towel and tissue goods fell.

JUGS of fountain syrup were total loss. Mud got under their screw caps.

LABOR costs were too high to justify much saving of small canned goods.

Steps In Salvaging Deluged Goods



CANNED GOODS were reconditioned by washing, rinsing, dipping in 100-200 ppm. chlorine solution, then relabeling. This procedure was recommended by American Can Co.

DRY ICE was rowboated into this cold storage plant when waters knocked out the refrigeration system. Saved were those containers of frozen eggs above water-line.

Spoiled Items Are Scooped Up and Buried

BAKERY GOODS in flood area went to mush. Here, high-lifters toss mess into trucks for toting to disposal.

TRENCHES are dug for burying non-salvageable foods, thus relieving overtaxed garbage-disposal facilities.

DEPENDABLE
under severest conditions of dust and dirt!

DODGE-TIMKEN

- Even under layers of grime, dirt and abrasive dust encountered in many production operations, the Dodge-Timken Type C bearing carries its power load smoothly, efficiently, without interruption—because it's
- Triple-sealed to prevent the entry of dust, however fine. Accurately machined steel seals keep dirt *out* and lubricant *in*.
- Dodge mounts, seals, houses Timken precision bearing units in rugged assemblies (four different types) to deliver a minimum of 30,000 hours uninterrupted service.
- Dodge Timken Type C Pillow Blocks are fully self-aligning, with both radial and thrust carrying capacity.
- Delivered fully assembled, adjusted and lubricated, ready to lock on shaft. Locking collars at both ends insure firm fastening.
- Normally available from Dodge Distributors' stocks, sizes from 1-7/16" to 4-15/16".

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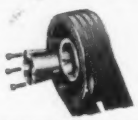
FIRST IN POWER TRANSMISSION MACHINERY!



V-BELTS AND TAPER-LOCK SHEAVES

TORQUE-ARM SPEED REDUCERS

ROLLING GRIP AND DIAMOND B CLUTCHES

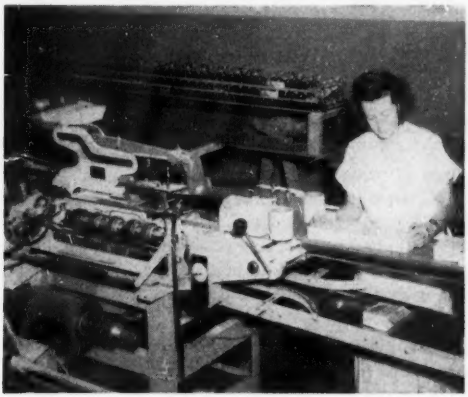
SOLID STEEL CONVEYOR PULLEYS

New Way to Bread Seafood

FIRST STEP in process is to dip fillets in batter and place on bed of crumbs—seen cascading (arrow) from machine.

AFTER crumbs go on top of fillets, breaded products pass under roller (A), slide over grid (B), and are trayed.

BREADED FILLETS are then weighed and packed, 12 oz. to a carton. Scallops are packaged about 30 pieces per carton.



CARTONS of breaded fish are machine-wrapped in heat-sealable cellophane. Freezing in air-blast unit follows.

Fillet Breading Now Mechanized

Gloucester fish processor employs new machine to coat his products uniformly with crumbs . . . Technic can be adopted by meat packers

SALES of breaded, frozen fillets and seafoods—relatively new consumer convenience items — have increased within the last few years to such a point that fish processors have begun to look for more efficient methods of breading their products.

Recognizing the need of mechanizing breading operations to sell these items in highly competitive markets was Mariners' Fish Co., Gloucester, Mass. This firm immediately went ahead with a program that led to the special private development of a completely automatic breading machine.

Now, instead of hand-dipping fillets and other seafoods into bread crumbs, these products are fed onto a 2-in. layer of bread crumbs on a conveyor belt. Crumbs have previously been applied on the belt by the new machine. And, as the belt carries the bottom-breaded fillets under the machine, more crumbs are sprinkled on top of them. Remaining crumbs are recovered, sifted free of lumps, and re-sprinkled.

■ **Meat packers perhaps could borrow a page from this fish processor's book by breading and freezing such items as veal cutlets and pork chops.**

Now as to how the mechanized breading is carried out at Mariners':

Haddock and flounder fillets are cut to 4-in. lengths, and ocean perch fillets are selected for size. Scallops are cut 30 pieces per 12 oz.

Meanwhile, an egg-batter mix, consisting of eggs, milk, and spices, is

(*Turn to page* 169)

You Know What You're Getting ... in a Pedigreed Dog, or a Pedigreed Box

THE SCOTTISH TERRIER of the Scotch Highlands has a longer history than can be traced. His short legs and large head with small ears give an audacious yet friendly appearance. Loyal, active and full of character, the little "Scottie" is very popular today.

• • •

YOU GET the background in your dog's pedigree certificate. But you have to go behind the box maker's certificate to see whether *that* product is truly pedigreed.

Union's "pedigree" includes the forests of virgin timber — Union-owned and cultivated—the control of every step in manufacture through the world's largest integrated pulp-to-container plant—right through shipping of Union boxes to you.

All this means you can depend on Union boxes for uniformity, car after car, for minimum loss from breakage and fewer returns. You'll agree, as hundreds of America's great names agree, that Union corrugated containers are pedigreed.

For example—Scott Paper Company ships its famous facial tissues in Union's *pedigreed* boxes.

Dependable Packaging Since 1872

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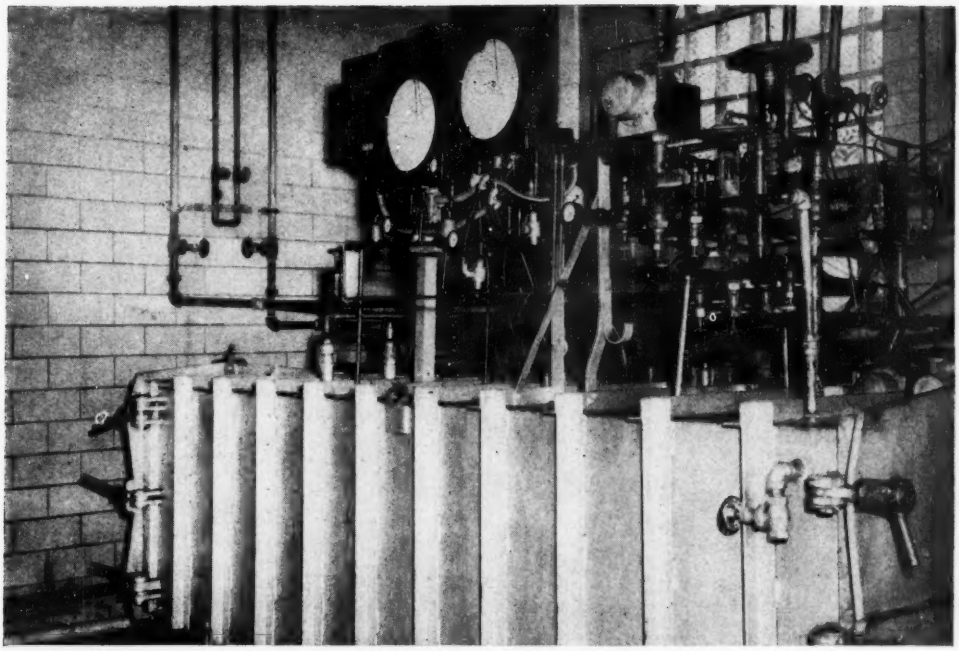


VERSATILE retort-control system was built up for Millar Bros. by adding more instruments and valves to original installation. New system assures controlled temperature rises, automatic pressure regulation, timed cooking, and controlled temperature decreases. An additional instrument enables packer to use retort for automatic ham boiling.

Save Dollars, Up Quality by

Putting *Hidden* Potential to Work

Thus, Philadelphia meat company "double-dutied" its retorts. And by clever application of instruments rounded out new system. Result: Glass breakage down to zero, and also greater output of better products with less supervision

ARNOLD ZITTEN and V. L. EVANS

Respectively, General Superintendent, Millar Brothers, and Instrument Engineer, Minneapolis-Honeywell Regulator Co., Philadelphia

Latent in *your* plant equipment may be a lot of dol'ar-saving and quality-making capacity that you didn't know was there—high potential begging to be recognized and used.

Take the case of Millar Brothers. This Philadelphia meat packer took time off to check on just that point—and profited. It re-evaluated, and then reapplied units to decided advantage, and as a result, it cut idle time on its processing machinery and achieved greater range for product handling.

Involved were horizontal pressure retorts which the firm's production planners decided were not getting full usage. They were principally being employed for pressure-cooking and cooling of glass-packed pickled tongues, which meant that under common conditions these units were only being used two or three days a week.

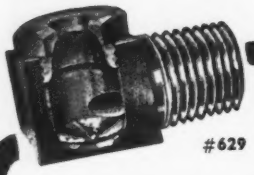
Hams and meat loaves had been boiled in open tanks. But by assigning this work to the retorts, Millar technicians speeded and simplified meat-boiling operations.

Moreover, new efficiency was further insured by fitting the retorts with automatic controls—an improvement that has paid for itse'f many times over. Here's what these instrument controls have done:

- **For glass-packed items, they have eliminated breakage of containers and insured uniform cooking. Glass breakage already has been cut to zero from a former average of 15 percent. Cooking is now safely performed in less time and space, with a minimum of supervision.**
- **And for boiled meats, the controls, together with an internal temperature measuring system, have assured greater safety, more uniform cooking, higher production, and superior texture and flavor in the final product.**

What's more, the renovated retorts

THERE'S A MONARCH NOZZLE FOR EVERY SPRAY JOB



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In many Food Processing plants Monarch Spray Nozzles are used to . . . .

Wax Fruits
Rinse Vegetables
Powder Milk
Dry Eggs
Wash Filter Cake
Humidify
Banana Rooms

Remember

if the liquid can be sprayed with direct pressure Monarch can furnish the Nozzles.

Send for Catalogs 6 A and 6 C

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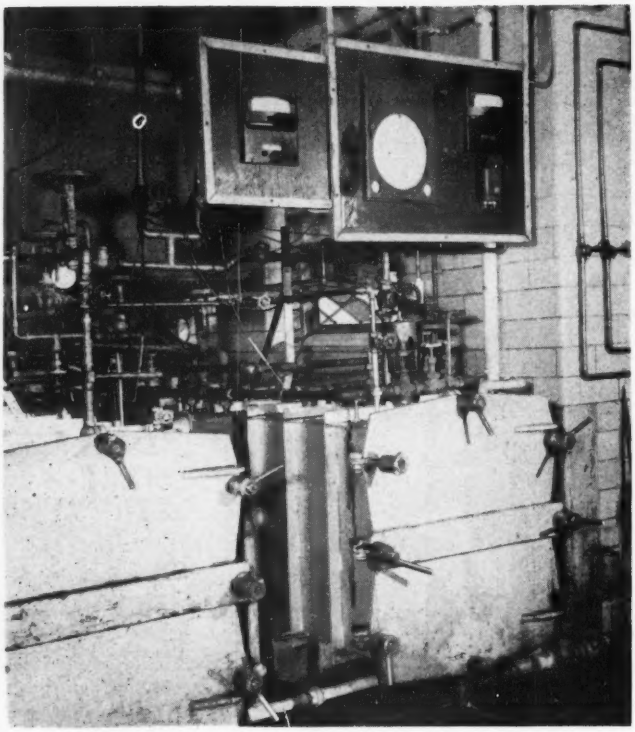

INTERNAL TEMPERATURE of hams is measured by vane-type millivoltmeter controller (top) that ends cook when desired temperature is reached. Here, thermocouples are suspended over retorts.

have proved so satisfactory for boiling hams and other meat products that workers avoid using the conventional boiling tanks whenever the retorts are available.

Custom-Built Control System

Originally, the retorts had only temperature recorders. These instruments were converted and incorporated into the present system. Provided is an automatic control of both temperature and pressure during cooking and cooling. Rate of temperature increase during the "come-up" time is controlled to decrease heat shock to the jars. Temperature and pressure are regulated during cooling to prevent breakage or blowing off of the tops.

Standard equipment for controlling the rate of temperature increase and decrease were not available when this system was installed. So the instrument manufacturer's local service department custom-made the instruments to do the job.

Also included in the system is a vane-type millivoltmeter controller, which is used only in the meat-boiling operation. This instrument is connected to a sanitary meat thermocouple, which is inserted into the center of one of each batch of the hams or meat loaves. The control index of the instrument is set at the desired internal temperature, and the cook is automatically terminated when this temperature is reached in the center of the meat.

Cooking in Glass

When the retort is loaded with jars for processing and then filled with water, an operator turns a switch inside the instrument to set the cam drive in motion. A diaphragm valve, controlled by the instrument, immediately moves to the "full-open" position to bring the temperature of the retort to 160 deg. F. as rapidly as possible.

When this temperature is reached, the instrument throttles the steam valve to permit the temperature to continue rising at the controlled rate of 2 deg. F. per min. until the final holding temperature (about 240 deg. F.) is attained. This temperature is then automatically maintained during a timed holding period.

After the holding period (when the unit "times out"), the steam is auto-

matically shut off. A valve then opens, thus emitting fresh water to cool the jars at the rate of 2 deg. F. per min., until the temperature reaches approximately 80 F.

A pressure of 17 lb. is maintained in the retort during cooking and cooling. In cooling, the pressure is produced by the controlled admission of compressed air into the retort. After cooling, the report is drained, and the jars are manually unloaded from the baskets.

Prior to the installation of the new controlled system, a considerable number of jars were unsalable because their lids had become scarred during the violent agitation when steam was admitted into the retort. Close, automatic regulation of the steam supply has minimized such agitation during heating, and hence there is no longer any disfiguration of jar tops.

Boiling Operations

In the boiling of hams or other meats, the products are loaded into square baskets, mounted on dollies, on the processing floor and wheeled up a ramp into the retort. Each retort holds 90 hams weighing 10-15 lb. each, or a corresponding amount of another item. When the retort is loaded, the end doors are dogged-shut, the retort is filled with water, and the meats are boiled.

Only a few minor adjustments are required to convert the retort from a pressure-processing to a boiling unit. The control point of the thermometer must be reset—by turning off the power supply to the cam drive and then manually rotating the cam until the set-point index is at the desired water temperature for boiling.

A gate valve has been installed in the top of each retort to facilitate the use of the internal temperature-measuring thermocouples. During pressure-cooking, this valve is sealed. However, when meat temperatures are to be measured, the valve is opened and the meat thermocouple inserted through an opening in the retort. A sufficient amount of extension wire is provided for insertion of the thermocouple into one of the hams or meat loaves before loading them into the retort.

With the control index of the vane-type millivoltmeter set at the internal temperature to which the meats are to be cooked, the operator lets the cook proceed without supervision. When the proper internal temperature has been reached, steam going into the retort is automatically shut off and a red light blinks on the controller to attract the attention of the operator. The light continues blinking until the reset button has been pushed.

For cooling, water may be run in over the cooked meats, or they may be

Well wrapped packages
SELL ON SIGHT

Packaging has come a long way since frozen foods were first introduced to the public. Today's packages are more colorful, show the product in appetite-arousing pictures—*and are far better wrapped.* For successful packers realize that an attractive package which says "QUALITY" spends less time in the display case—gets to the check-out counter faster.

In their efforts to achieve perfection in packaging, packers have found the FF their logical choice. This machine, you see, is especially designed for frozen foods. It handles metal-end fibre cans and trays as efficiently as ordinary cartons and is easily adjustable for various sizes. Freezing of the product before wrapping cannot affect the wrap, for the FF automatically makes allowances for variations up to 3/8" in the width of packages. Its specially designed in-feed prevents any spilled pieces from being carried into the machine. Its advanced design also permits faster cleaning and oiling.

A straight-through machine, which can be operated from either side, the FF fits in perfectly with any plant layout and it has a cost-cutting speed of over 100 packages per minute.

For tops in wrapping and in operating efficiency, its the FF by a wide margin.

Write for further information

PACKAGE MACHINERY COMPANY • Springfield, Mass.
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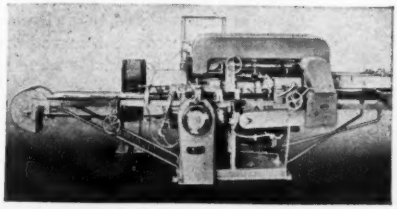

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Norda puts a lot of extra goodness into NORDA BUTTERSCOTCH FLAVOR. You can taste the butter-richness. Everyone seems to like it.

There are reasons for that richness. Norda believes in using only fine ingredients. The skills that blend them expertly have been learned through many years.

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unloaded from the retorts to bring them to a lower temperature.

Records are provided of retort temperatures and pressures for all pressure-cooking operations, and of water temperatures for the meat-boiling processes.

Since the new system incorporates automatic water-temperature control and internal temperature measurement during boiling, time required for supervision of the operation and for safe processing are reduced.

As a result, it was possible, on one recent occasion, for Millar's three-man cook-room crew to process 64,000 lb. of meat (34,000 lb. of ham and 30,000 lb. of boiled pickle and pimiento loaf) during a ten-day period in order to meet an Army contract deadline.

Retort Ideal for Boiling

After months of operation, the use of the retorts for boiling meats was found superior in several respects to employment of conventional tanks. Loading and unloading time is reduced, since basket-loads of meats are rolled into and out of the retorts. Actual loading of a retort takes only a few seconds—baskets for the next run being filled while the retort is in operation.

True, there was an initial drawback in using retorts for such boiling: Inability of the operator to remove one of the boiling forms for testing when he thinks the cook is terminated. However, the internal temperature-measuring system described, now completely eliminates this difficulty.

—End—

Speed Mold Counts

—Continued from page 112

the platform. This will be your first field to observe.

Pre-select your other fields without looking into the scope. Just move the upper right hand corner of the chamber to coincide with the proper coordinate point. Start at 1-A, move from 1-A to 5-A, over to 5-B, down to 1-B, then to 1-C, up to 5-C, down to 1-D, to 1-E, and up to 5-E, the finish.

Advantages of Method

Since each successive field observed is pre-selected, there will be a reduction in the personality factor. Taking the ego out of any technic is always desirable.

Another advantage is important in training beginners: Using this counting procedure it is possible to return without error to any particular field for rechecking. If, during counting, the technician is interrupted for any reason, he can always immediately go to the spot where he left off. This is readily done, even though the mount may have been removed temporarily.

The modified procedure takes much of the guesswork out of the technic of mold counting. This fact alone makes it possible to train a neophyte in very short time. After a thorough grounding on the properties of mold, and the actual technic of counting, the beginner is immediately into the job

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Special articles with the accent on the "how"—to help you do a better job of producing quality food products at low cost—are now "on the line" for early issues. To name just a few . . .

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Beverage Bottler Improves Washer Operations

Advanced Methods in Cereal Manufacture

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☐ **Woven Wire Conveyor Belts Bulletin No. 82.** Technical charts set forth Comparative Ultimate Strengths of Rod-Reinforced, Balanced and Sectional Belt weaves in meshes from 1" to ¼" mesh.

☐ **Woven Wire Conveyor Belt Bulletin No. 86.** Illustrates and describes conveyor belt installations in glass plants, bakeries, rubber manufacturing, ice cream plants and food packing.

☐ **Woven Wire Conveyor Belt Bulletin No. 89.** For food and pottery plants. Describes belt uses and also shows special belt attachments and selvages.

☐ **Metal Specialties Bulletin No. 99.** Describes and illustrates Cambridge facilities for design and fabrication of metal specialties for handling bulk parts through hot, cold, abrasive, corrosive or wet processes.

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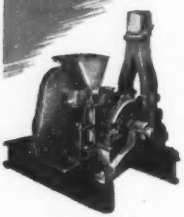

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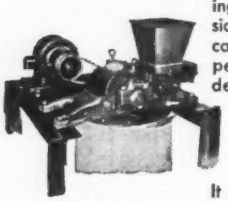
This Plan has enabled many food manufacturers, large and small, to improve quality, increase quantity, decrease power consumption (in some cases as much as 75%) and to eliminate such cost and time-consuming items as screening and classifying, duct work, etc.

The scope of the MIKRO PLAN is almost as broad as the Food Industry itself . . . embracing both wet and dry milling. But the proof of its plus efficiency lies in its conspicuous success in handling those products requiring granulation or ultra-fineness, and perfect dispersion of particles. Here are some of the products which can now be processed at much lower grinding temperatures than ever before, as the result of recent developments.



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or fine grinds

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of serious counting, guided accurately by the grid coordinates. It is then no more than a matter of supervised practice until speed is gained.

Technicians who have used this modified procedure have found that their counts of a given sample approach more closely the mathematical average of counts on the identical sample made by others using the regular procedure. Indication is that with the modified procedure the technician approaches more closely the "true" count for the sample under observation.

Mold Counting Tips

A few hints based on years of experience, may be helpful:

Grid coordinates can be placed on the mechanical stage of either a monocular or binocular scope.

Canners generally use monocular instruments, because of initial lower cost. And some technicians insist that use of a single eye results in better perception. Certainly, the monocular scope is best for those afflicted with astigmatism.

Here is a kink that may be useful: To hold the microscope to the proper size field, the draw tube can be "locked" in place merely by wrapping a rubber band around it at the point where it slides into the body of the microscope.

In mold counting, the quality of light is very important. Excellent light is obtained by this procedure: Turn the Abbe condenser all the way up. Remove the mirror and place a small sub-stage lamp well up under the condenser. Support the lamp with a block of wood of the proper size. With the lamp in this position, there will be no fuzziness to the light. For further improvement of the light, place a blue disk in the condenser.

If a grid is stamped on report sheets, both speed and accuracy are gained. Such report-sheet grids should contain 25 squares, one for each coordinate point on the stage. Mark positive fields with a plus in the square corresponding to the field. Waste no time marking negative fields. If this method is followed, back-checking will be simplified.

When counting, observe five fields in each five rows on a slide. The modified method makes this easy, and avoids the technician's common dilemma—"I'm at the end of a row, and have looked at only three fields", or "I'm not yet at the row end, but have counted five fields".

By using the method described here, such bothersome worries are removed, and the beginner quickly progresses as a good mold counter with but a minimum of practice and experience.

End (*Resume reading on page* 113)

Sanitation Sets Pace

--Continued from page 111

ered and pasteurizing temperature reduced to 136 deg. F. And the new low temperature was found to provide equally satisfactory stability.

Next problem was to properly cool the beer after pasteurization. The sped-up unit had all it could do to handle its pasteurizing function, so an extension spray had to be placed in its tail-end for cooling bottles below 90 deg. F. The brewery is now thinking of rigging up an oscillating fan to further reduce temperature.

Sanitizing Procedure

Key to the success of Ambrosia's fast-pasteurizing is the fact that the product is provided as aseptic as possible to the filler. This is accomplished by the more rigorous sanitizing schedule that is vigilantly maintained in the brewery.

All product-handling lines are cleaned once a day, and those in the fermenting cellars are sterilized with hot chlorinated TSP daily. Then, once a week, all lines are hooked up to one pump and a solution of hot chlorinated TSP is pumped through the whole network. This sanitizer is made up and heated for the occasion in a 5-bbl. tank.

Process equipment is all scrubbed and cleaned after use. And after cleaning, the man responsible initials the unit. The foreman on the job then checks all work before the equipment again operates. Further, there is a biological analysis of beer from each tank, and results are checked back against the efforts of clean-up operators.

In addition, sterilizing lamps have been installed in the fermenting rooms to cut down contamination at that critical point.

Flavor Bonus

While primary object of the pasteurizing speed-up was to swell bottling line output to its current 30 bbl. per hour (old volume was 12 bbl. per hour), another even more important gain resulted—an interesting change in beer flavor, followed by increased consumer acceptance.

Customers soon noticed how the fast-pasteurized beer approached unpasteurized draft beer in taste. Thus, many devotees of the keg soon were stocking their home refrigerators with bottles.

And Ambrosia's place in a well-established local market was even more firmly secured.

End (*Resume reading on page* 112)

BASIC FACTS ABOUT MODERN MATERIALS HANDLING

HOW IT WORKS — WHAT IT DOES— WHAT IT SAVES

Study of major importance to business and industry is made available by CLARK

A practical, profitable way to produce more goods with the same amount of human effort, is presented simply and graphically in a new booklet offered by the Industrial Truck Division of the Clark Equipment Company, of Battle Creek, Michigan.

This booklet points up technological advances in materials handling operations that are effecting extraordinary benefits for industry—such as faster production, increased economy and efficiency, improved human relations, lower accident and damage rates, quickened distribution and substantial cash savings. Simply and directly it describes tested and proved means to help speed up and perfect the imperative integration of a military and a civilian economy

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Concretely, this study points up a quick and certain way for Industry to save some $2,000,000,000* annually at a time when the country, faced with a rearmament program of 50 billions a year for at least three years, is in desperate need of every possible mechanical aid to save time and speed production. Many advantages in other directions, not reckoned in dollars and cents, will be recognized at once by every reader.

This new CLARK study is neither fancy nor complex. It is a well-illustrated, simply-written exposition of the sound and sensible fundamentals on which modern materials handling techniques and practices are based. It describes ways and means of getting the most out of fork-lift trucks, powered hand trucks and industrial towing tractors, at the least possible cost. For the many businesses which have not yet adopted modern handling methods and machines, the booklet will be found invaluable. For the thousands of progressive businesses already employing modern methods and machines, it is just as valuable as a check against omissions, abuses and opportunities for full achievement of production goals and potentials.

SEND FOR YOUR COPY

To get a copy of *"Basic Facts About Materials Handling"* fill out the coupon, attach it to your business letterhead and mail it to the *Clark Equipment Company, Industrial Truck Division, Battle Creek, Michigan.* If you want additional copies for key personnel, they are available in reasonable quantities.

**Materials Handling Case Book; McGraw-Hill Book Co., Inc. 1951*

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Synchronized Filling

—*Continued from page* 83

the filler attendant. If things go amiss, she can simply stop the entire line before much fruit is damaged.

After filling, containers pass under the synchronized syruper for addition of 55 deg. Brix syrup. Automatic clamping of a metal end on the paperboard freezing carton follows, then the product is belt conveyed into the quick-freezing area.

Ups Quality and Production

Success of the line on soft red raspberries—a very delicate fruit—should pay for the new equipment required in only a few seasons. For one thing, the pack now consistently grades less than 2 percent broken fruit, which puts it in a premium-price classification (USDA perfect score is 4 percent or less). And the greatest texture damage we have seen this year in any container is 7 percent—as opposed to frequent checks showing texture off as much as 30-40 percent in last year's pack.

But the most gratifying result is our ability to get this fine quality at filler speeds of up to 200 containers per minute. Not only does this triple last year's pace, but it moves red raspberries into the realm of lower cost processing.

End (*Resume reading on page* 84)

Roller-Bed Trailer

—*Continued from page* 107

Now, let us run through the speedy new method: Trailer is backed to loading dock, and its rear end is elevated 6 in. Carrier-board is then dropped on movable conveyor and cranked into position for the first pallet. Before the fork truck can return with a second pallet, the truck driver has cranked the assembly in position for it.

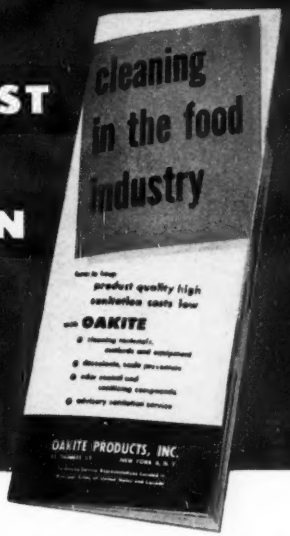
No Need to Jockey

The fork truck does not have to jockey into position. Only requirement is to approach the board at right angles, anywhere between the first pallet and the upright. Load is lowered to within about 1 in. of the board, which is then shifted by the truck driver until the pallets meet. Only then is the load released by the fork.

At the shipper's plant, 20 pallets, each weighing a ton, are loaded in 20 min. by one man operating a fork

Free Guide

TO LOW-COST SANITATION



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A NEW REFLECTANCE ACCESSORY that simplifies color evaluation

To further increase the wide range versatility of the well-known Beckman Model B Spectrophotometer, a new Reflectance Accessory is now available for use on opaque, colored samples in solid, liquid or powder form. There are many useful applications for this accessory in the precise evaluation and comparison of color intensities and hues.

For example, diffuse reflectance measurements are useful for accurately controlling the whiteness of talc . . . for controlling artificial coloring of foodstuffs such as butter, catsup, and condensed milk . . . for calculation of dye bath recipes in textile processing . . . for grading the color of paper and the whiteness of flour . . . for matching and controlling shades of powder, rouge and lipstick, paints and inks and many other products where accurate color measurements are essential.

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Important features of this new Reflectance Accessory are outlined at right. A bulletin describing the unit in greater detail will gladly be sent. Ask your nearest Beckman Instrument dealer for Bulletin #235—or write direct!

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The attachment consists of an integrating sphere in holder and a sliding sample tray which are easily installed in place of the standard Model B sample compartment and cell carriage.

Precise Measurements

To permit utmost measurement precision, a detent mechanism operated by a convenient push button in the sample tray knob exactly reproduces forward and backward position of the sliding sample tray. The resulting precision is particularly valuable for accurate measurements on samples with rough surfaces or non-homogenous colors.

Readings taken rapidly are reproducible to at least 1%—with careful technique even greater precision is obtained.

Operating Convenience

Special provision has been made so that liquid samples can be conveniently inserted without spilling . . . powdered samples without disturbing the smoothed surface.

Sample Size

Sample size is approximately 1" x 1 1/4" with a maximum thickness of 5/16"—ample for most applications. Or, by simply rotating the sphere 180° in its holder, larger samples can easily be accommodated.

Quick, Easy Readings

Accurate color measurements are made with great speed and simplicity. First the instrument is adjusted to read 100% reflectance on a white standard (such as MgO), the sample is moved into position and the percent reflectance (compared to the standard) is then read directly from the meter. It's as simple as that—and the three-compartment sample tray permits quick comparison of two samples and a standard on each run.

truck. Included in loading period is the time used for securing bags to pallets with webbing straps, also the time for anchoring pallets to the trailer with toggle blocks, chain and clamps.

There is no dock at the plant of American Chicle Co. The truck must back its trailer into a doorway. Here, pallet handling is also by fork truck, operating from the trailer rear, but unloading from ground level.

As soon as the two pallets on each boards carrier (see unloading sequence photos) have been shifted into place and lifted off, the empty board is removed to make room for the next. Truck driver loads pallets in proper place faster than fork truck can take them away.

"20 in 20"

Present unloading time for 20 tons is 20 min. One man and a fork do the job. Formerly unloading this same number of bags by hand consumed an average of 8 man-hours.

Since loading is cut to one-fifth by this mechanized method, the result accomplished is the same as if five additional doors were installed on the docks.

Rapid unloading at the user's plant accomplishes a similar result. More out-going and in-coming shipments can be handled in the same loading and unloading area.

In-plant handling, too, is speeded when bags are thus palletized. Warehouse stacking, or lifting bags down from stacks for processing, no longer is back-breaking labor. Mechanical handling also reduces bag breakage, assures a cleaner plant.

Bags on pallets have been stacked 40 high—whereas 7 to 8 is the limit for hand stacking. Ceilings permitting, warehouse capacity for the same floor space is thus considerably increased.

End (*Resume reading on page* 108)

Figuring Refrigeration

—*Continued from page* 110

is then pumped to the rooms to be cooled, where it absorbs heat. On return to the brine cooler it gives up its heat to the refrigerant and is ready for re-use. Circulation of brine may be continuous during plant operation.

Three types of brines have been used in refrigeration plants: Sodium chloride, magnesium chloride, and calcium chloride. The latter is most commonly used because it is less corrosive than the others and has a lower freezing

point. Brine freezing point depends on solution concentration, purity of the commercial salt, and degree of contamination during operation. In well operated plants where good quality salts are purchased and contamination is carefully avoided, brine concentration is the only factor usually considered in determining freezing point.

Large plants generally use brine with a freezing temperature 10 deg. F. or more below lowest temperature anticipated in operation. In small plants where careful control cannot be expected at all times, the brine solution is made as strong as possible without having it unstable. Usual specific gravities of the solution run from 1.240 to 1.250.

Where large brine tanks are used, refrigeration may be "stored" in the tanks by cooling the brine to a low temperature, shutting down the refrigeration machine, and continuing brine circulation.

Quick Answers by Nomograph

Fig. 4 offers a convenient nomograph for quickly estimating the amount of refrigeration tonnage in a given flow of brine.

Suppose, for instance, a brine pump circulates 2,000 gpm through a cooling coil, causing a 5 deg. F. temperature rise. How much refrigeration is produced in 24 hr.?

To find the answer, simply lay a straightedge on the chart, connect 2,000 on the gpm. scale and 5 F. on the temperature-rise scale (see dash line in figure). At intersection with the tonage scale the solution—350 tons—is read.

This nomograph is based on a brine having a specific gravity of 1.240 and a specific heat of 0.686 Btu. per lb. A brine of this specification contains mostly calcium chloride. Specific heat and gravity change with both salt content and temperature. Note that for conditions other than those stated above, the chart results will be in error up to about 4 percent.

If you need *exact* figures, take ratios of actual gravities and specific heats to the chart values, then multiply by chart results. Formula for the chart:

$$\text{Tons} = \frac{\text{gpm. x temperature rise F.}}{28.56}$$

Calculation methods outlined in this article are basic and cover only a few of the many possible situations that may be met. However, they provide a starting point for food industry men who must make first approximations and those who desire to make a comprehensive study of the refrigeration systems.

End (*Resume reading on page* 111)

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NEW PACKAGES & PRODUCTS

Redesign Gives Better Product Identity

Double advantage of instant product identification and a more attractive package has been acquired by the Baker Extract Co., Springfield, Mass., with the adoption of newly designed individual cartons for its complete line of flavoring extracts.

Featured on the new cartons are attractive 4-color lithograph illustrations of the fruit from which each extract receives its flavor. Brand name and product identity are given more boldness to facilitate instant display-shelf recognition.

The new package also carries the premium coupons and recipes that were on the former container. The premium coupon has been relocated on the side to allow more space for the retailer price marking on the top.

Sample-Durick Co., Chicopee, Mass., supplies the cartons. Bottles are furnished by Owen-Illinois Glass Co., Toledo, Ohio, with molded plastic closures by Armstrong Cork Co., Lancaster, Pa.

Complete Chinese Dinner for Two

Everything from soup to tea is included in the new "Chinese Dinner for 2" packed by Chin & Lee Co., Inc., New York City.

Packaged in a colorful chipboard carton are the following items: A 1-oz. heat-sealed cellophane packet of noodle soup mix with chicken fat, a 13-oz. can of vegetable chop suey, a vacuum-packed can of Chow Mein noodles, a small bottle of soy sauce, and two cup-size bags of Chinese tea.

The compact packaging of the items in the carton with its combined weight of little over a pound makes it a convenient item for the consumer to pick up and carry home.

Distribution is by Taylor-Reed Sales Corp., Glenbrook, Conn.

Dairy Adds Frozen Foods to Line

A new line of consumer-pack frozen foods has been introduced by The Borden Co., New York City, through M. Angenblick & Bro., Newark, N. J.

The initial items being offered under the name of "Borden's Frozen Foods" are French fried potatoes, leaf spinach, chopped spinach, peas, cut green beans, French cut beans, strawberries and cut-up chicken.

As the 1951 crops come in, the line will be extended to cut corn, baby limas, Ford Hook limas, succotash, mixed vegetables and broccoli.

Borden's Frozen Foods, Inc., was organized to handle the procurement of frozen foods from processors and the sale of such products to service wholesalers and wholesale distributors. There are no plans at present to build any packing plants.

The label, featuring full-color art work of each product, aims for strong appetite appeal. Elsie, the company's famous cow, is prominently pictured on the package with the Borden logotype. Large white-on-red letters give easy consumer identification.

Fruit and vegetable labels, of wax overwrap type, are by Marathon Corp., Menasha, Wis. Cut-up chicken is packed in a two-piece carton manufactured by American Coating Mills Div., Owens-Illinois Glass Co., Chicago.

For More Data on Package Supplies Named Use Reader Service Card

For reliable glass
– ARMSTRONG

Glass engineers at Armstrong are old hands at producing quality ware. From tiny dropper bottles to large food jars, this ability has resulted in dependable performance (and greater sales appeal) of the finished containers. Perhaps your present bottle or jar is causing inefficiencies in the performance of the filling line or possibly it lacks a quality needed in the field. If so, ask your Armstrong representative about our glass or write to Armstrong Cork Company, Glass and Closure Division, 4210 Prince Street, Lancaster, Pennsylvania.

Gentlemen:

This is to acknowledge receipt of your Separations Analysis Kit by our Engineering Department.

Case history files (maintained since 1888) are now being checked to determine whether or not your particular separations problem is identical, or similar, to hundreds of others already solved through use of Sutton Specific Gravity Separators and Air-Float Stoners.....

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SEPARATIONS ANALYSIS KITS are available to food industry personnel, free of charge. Take a smart step toward developing better processing methods. Write for your Kit today.

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SALES AND SERVICE: DALLAS, COLUMBUS, GA., NEW YORK, PITTSBURGH, CHICAGO, MINNEAPOLIS, JACKSON, MICH., DES MOINES, SAN FRANCISCO, TWIN FALLS, IDAHO FOREIGN: WINNIPEG, CANADA; SAO PAULO, BRAZIL; LONDON, ENGLAND

SUTTON, STEELE & STEELE, INC.

Sample Slices Increase Bread Sales

To build recognition of its regular loaf wrapper, and to stimulate interest in its bread varieties, Marshwood Co., Oconomowoc, Wis., is distributing the two items shown above.

The glassine sample envelope for individual bread slices repeats the general wrapper design of the full Brownberry loaf. The thermo-top seal of the envelope gives a convenient air-tight seal.

As a companion to this merchandising campaign, a sage and onion stuffing is being offered. It is placed in a string-tied Pliofilm pouch, with the design printed in the same two colors as the sample bread, a warm brown and antique cream. Directions for cooking are printed on each side panel, together with a recipe.

These items were designed and produced by Milprint, Inc., Milwaukee.

New Packages for Meat Products

A new 6-lb. carton for skinless frankfurts has been recently introduced by Camp's Meat Food Products, Cortland, N. Y.

The new carton is narrower and longer, with the display card in the back lower for easier display in showcases.

The automatic set-up package reduces labor costs, and a sleeve protection during shipment is said to provide complete sanitation.

Carton is designed and manufactured by United Board & Carton Corp., Syracuse, N. Y.

A self-service package for link sausage is now being offered by Marathon Corp., Menasha, Wis.

Called "Look-Pak", it consists of die-cut, white paperboard, scored so ends, when drawn together and locked, form a rectangular collar. Transparent film overwrap is available in a number of types, depending on protection required. Film wrapper is unprinted for good visibility of product. Top band provides excellent space for colorful design and brand name, with additional space for printed matter on back panel.

Complete Popcorn Kit

Everything needed to make the finished product is included in the popcorn kit now being offered by Chunk-E-Nut Products Co., Philadelphia.

Kit contains a 6-oz. heat-sealed cellophane bag of popcorn, a 3½-oz. bottle of popping oil, and four packets of special popcorn salt.

The ingredients are packed in a red, brown and yellow chipboard carton, resembling a miniature television set that can be used as a toy by children. In the cut-out window is an illustration of a parrot, from which balloons the "Chunk-E-Nut Home Popcorn Pack" trademark.

Colorful Bag for Noodles

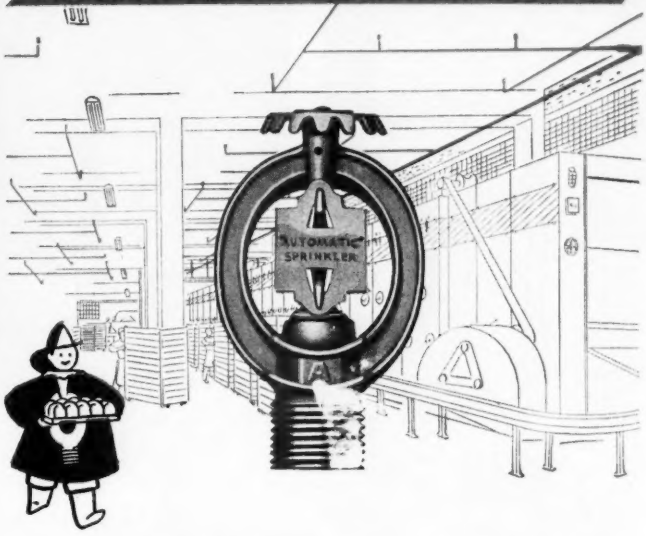
Appreciating the value of eye-appeal, I. J. Grass Noodle Co., Chicago, is now marketing its egg noodles in a cellophane bag with a 5-color rotogravure design.

The package contains a colorful, realistic reproduction of an appetizing noodle dish. On the reverse side are instructions for preparing the spotlighted dish, as well as various ways for preparing other noodle dishes.

Because of its high visibility on grocers shelves and its appetite appeal, it is expected to be a definite sales booster.

Package was designed and produced by Milprint, Inc., Milwaukee.

FIRE SAFETY WITH SAVINGS FOR AMERICAN BUSINESS



These bakery plants get safety-plus, with Fire Protection by "Automatic" Sprinkler

Here listed are but a few of the nation's leading bakery products manufacturers who are safeguarding lives, property and—saving money, through the investment of absolute "Automatic" Sprinkler fire protection:

American Stores Company	.	Philadelphia, Pa.
Burny Brothers, Inc.	.	Chicago, Ill.
Capital Bakeries, Inc.	.	Pottsville, Pa.
George E. Drake Baking Co.	.	Pittsburgh, Pa.
Finney's Holsum Bakery	.	Greenville, Texas
Gordon Baking Company	.	Detroit, Mich.
Hathaway Bakeries	.	Syracuse, N. Y.
Hathaway Bakeries	.	Boston, Mass.
Holsum Bakeries, Inc.	.	Tampa, Fla.
Johnson Biscuit Company	.	Sioux City, Iowa
Kern's Bakery	.	Knoxville, Tenn.
McGough Bakeries Corp.	.	Birmingham, Ala.
Pacific Cracker Company	.	Los Angeles, Calif.
Purity Bakeries, Inc.	.	Kansas City, Mo.
Purity Baking Company	.	Rockford, Ill.
Schwebel Baking Company	.	Youngstown, Ohio
United Cooperative Society	.	Fitchburg, Mass.

Consult the classified section of your telephone directory for our nearest representative, or call or wire us collect.

Adequate fire protection is essential to the economic operation of any food products plant and—the same is true for all types of industrial, commercial and institutional properties.

Our field representative will be happy to prepare a fire protection analysis for your consideration. Then, you'll be able to see at first hand, why "Automatic" Sprinklers are universally recognized as an important investment today . . . welcomed protection tomorrow—next week—next year—or whenever they are needed.

"AUTOMATIC" SPRINKLER CORPORATION OF AMERICA
YOUNGSTOWN 1, OHIO

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FIRST IN FIRE PROTECTION
DEVELOPMENT . ENGINEERING MANUFACTURE . INSTALLATION
OFFICES IN PRINCIPAL CITIES OF NORTH AND SOUTH AMERICA

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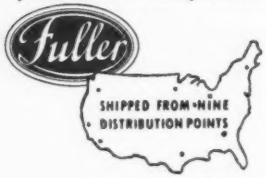
"Hungry" Duster
Gobbles up Dust!

You will find a Fuller Dry Duster more economical than dust cloths. Fuller Dusters are built of our special cotton yarn -- whose millions of tiny fibrils reach out and hold (instead of scattering) huge quantities of dust.

In Fuller Dry Dusting Mops you will also find this special yarn, developed by our laboratory and produced under its supervision.



At home... in business, too
INDUSTRIAL DIVISION
FULLER BRUSH

3640 MAIN ST., HARTFORD 2, CONN.
In Canada: Fuller Brush Co., Ltd., Hamilton, Ont.

Ice Box Bottle

With re-usable containers gaining in popularity, C. H. Musselman Co., Biglerville, Pa., is now packaging its apple cider vinegar in an "ice-box" bottle.

It has a compact square shape making it easy to use as a refrigerator container for juices and other liquids after the vinegar has been used.

A colorful new label design carries the red apple identification.

Bottles are supplied by Owens-Illinois Glass Co., Toledo, Ohio, closures by Phoenix Cap Co., Chicago, and the labels by Piedmont Label Co., Bedford, Va.

Peanut-Cheese Spread

A combination of peanut butter and cheese, called "Pea-Chee" spread, is now being marketed by C. M. Lurch Food Products Co., Wheeling, Ill.

The product is a blend of aged cheese and No. 1 graded peanuts. It is said to have the rich smooth spreading quality of creamy butter with no oily separation.

Product is packaged in 12-oz. re-usable tumblers supplied by Owens-Illinois Glass Co., Toledo, Ohio. Colorful red closures are manufactured by Swan Metal Cap Co., Chicago, and the red and white label by Crocker-Union Div. of H. S. Crocker Co., Inc., Chicago.

Bread Biscuits

A non-fattening, dairy flavored biscuit, known as "Hi Protein Bread Biscuits", is now being put on the market by Concentrated Protein Foods, Inc., Bradley Beach, N. J.

The company reports that a "unique, concentrated, compression toasted process" is employed to make a weight-reducing, yet energy giving, product. It is said to retain its quality, flavor, freshness, all the natural vitamins, minerals and essential amino acids, and to keep indefinitely without spoilage.

Strawberry Yogourt

To make a now-popular health food more appealing, Bowman Dairy Co., Chicago, has introduced a strawberry yogourt.

Pasteurized fresh strawberries are processed with plain yogourt and evenly distributed throughout the product. Product's texture is smooth and flavor refreshing, and the eye-appeal parallels that of strawberry ice cream.

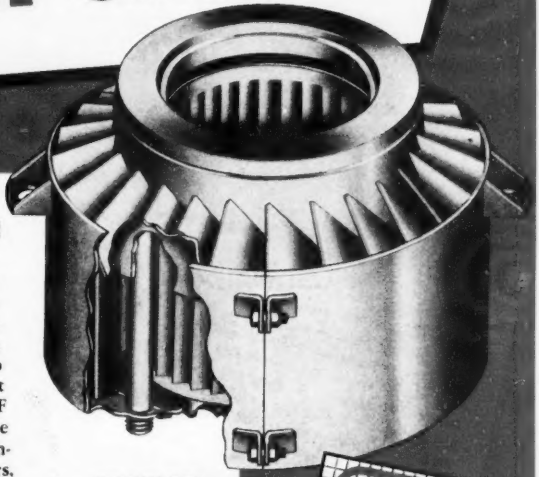
8-Oz. Sausage Line

A new line of 8-oz. ready-to-eat sausage items, especially designed for self-service cases, has been announced by Armour and Company, Chicago.

The packages are now availab'e in eight varieties—braunschweiger liver sausage, bologna, souse, jellied cooked corned beef, sandwich roll and sandwich spread.

To withstand handling and yet give the maximum visibility, these items are packaged in transparent casings. Both label and package were designed by

ANNOUNCING the NEW Anderson Hi-eF Purifiers



INTERNAL TYPE PURIFIER
Bulletin #100

MADE BY THE MAKERS OF SUPER-SILVERTOP STEAM TRAPS AND STRAINERS

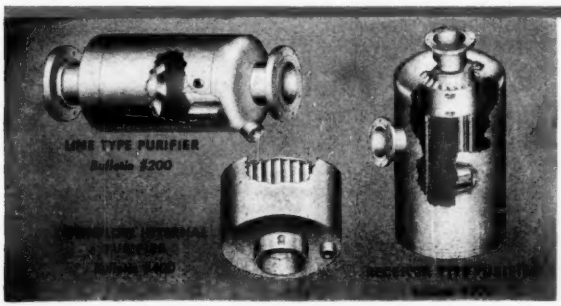
DELIVERS VIRTUALLY 100% QUALITY VAPOR!

Now, the V. D. Anderson Company, makers of Super-Silvertop Steam Traps, offers you a complete line of new Anderson Hi-eF Purifiers —the finest separating devices ever developed. These high efficiency units are guaranteed to remove virtually 100% of the entrainment from vapors—*even at extreme velocities!* Hi-eF Purifiers quickly amortize themselves. The internal-type Purifier illustrated here, for instance, produces clean steam from boilers, thereby increasing the life span of reciprocating engines, turbines, and super heater tubes. In evaporator operation, they boost production and in food and petroleum processing, assure a better, purer product.

Install Anderson Hi-eF Purifiers and forget them . . . they are self cleaning . . . without baffles or any moving parts. Good fluid dynamic design permits extremely low pressure drop.

Anderson Hi-eF Purifiers give you purifier efficiency at the price of an ordinary separator! Save by investigating these new, money saving units today. Anderson makes complete range of types in all sizes to any specifications.

Mail coupon for further information today.



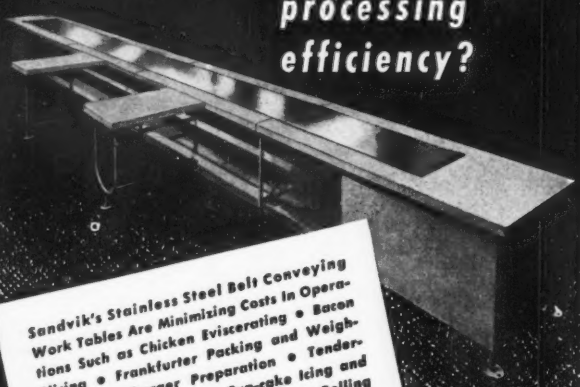
PURIFIER DIVISION,
THE V. D. ANDERSON COMPANY
1995 West 96th Street • Cleveland 2, Ohio

Gentlemen: Please send additional information on Anderson Hi-eF Purifiers described in:

☐ Bulletin #100 ☐ Bulletin #300
☐ Bulletin #200 ☐ Bulletin #400

Name .....
Company .....
Address .....
City ..... **Zone** .... **State** .....

Where Can This
MOVING TABLE TOP OF STAINLESS STEEL
...increase YOUR processing efficiency?



Sandvik's Stainless Steel Belt Conveying Work Tables Are Minimizing Costs In Operations Such as Chicken Eviscerating • Bacon Slicing • Frankfurter Packing and Weighing • Hamburger Preparation • Tenderizing • Cake-icing • Cup-cake Icing and Packing • Ham-boning • Pork Rolling Fish Filleting • Vegetable Preparation Potato Chip Distribution, etc.

Here's a way to modernize food handling operations. Sandvik's standard work table units carry your product on a flat, endless band of stainless or carbon steel. Units can be adapted to virtually any application.

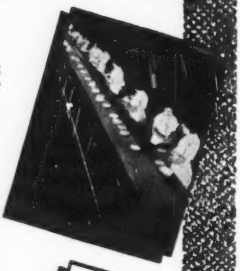
ADVANTAGES

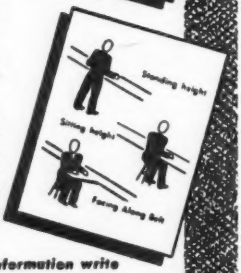
EASY TO KEEP CLEAN—Live steam or boiling water can be applied directly.

NO TASTE CONTAMINATION—A smooth, impermeable surface . . . No place for food particles to lodge.

LONG SERVICE LIFE—Sandvik steel belt has inherent high strength and resistance to time and wear.

ENGINEERED TO FIT APPLICATION—Lengths to meet any center distance. Standard work table widths are 20" and 12" but special widths are also available. Correct working height can be arranged despite special floor conditions. Special, custom-built units also available. SS-59

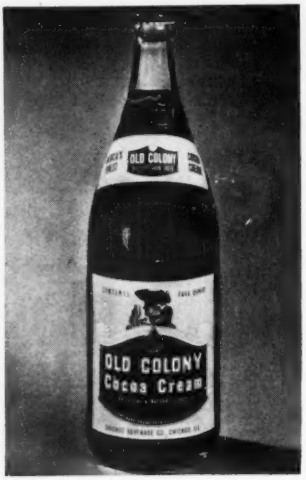




SANDVIK STEEL BELT CONVEYORS

For complete information write
SANDVIK STEEL, INC.
Conveyor Department
111 Eighth Ave., New York 11, N. Y., WA. 9-7180
Manufacturers Of Steel-Belt Conveyors For Over 30 Years

Raymond Loewy Assoc., New York City. Casings are of Saran, a product of Dow Chemical Co., Midland, Mich.



Cocoa-Cream Drink

After extensive research, Orange-Crush Co., Chicago, has started national distribution of its Old Colony Cocoa Cream, a carbonated beverage.

This sparkling drink has a smooth and distinctive chocolate-vanilla flavor that is obtained from natural cocoa extractives. There is fortification with other natural and artificial flavors.

It is now being sold to the company's franchise bottlers in cases containing four 1-gal. jugs.

Among present glass container suppliers are Thatcher Glass Mfg. Co., Chicago, and Hochstater Co., Inc., Chicago.

Retail distribution through bottlers is made in 32-oz. and 10-oz. bottles.

Package & Products Shorts

Sauces Added to Food Line

Five sauces—barbecue, sea food, Worcestershire, steak, and a smoke-flavored barbecue—are the latest addition to the Duncan Hines brand of foods, marketed by Hines-Park Foods, Inc., Ithaca, N. Y.

Non-Crack Polyethylene Bottles

Unbreakable Plaxpak polyethylene bottles of 1-gal. and 2-gal. capacities have been announced by Plax Corp., Hartford, Conn. Blow-molded, one-piece bottles, they will be of interest to packers and shippers of food and syrup concentrates. Being flexible, they will not crack in extremely low temperatures.

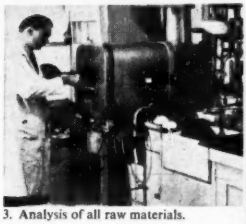
Carbonated Coffee Beverage

"Coffee Time," a sparkling coffee beverage, has been introduced by Coffee Time Products of America, Inc., Boston. —*End*

Important to users of CHOCOLATE COATINGS

1. Bacteriological control.

2. Laboratory check on finished chocolate.



3. Analysis of all raw materials.

One of Britain's best known brands of Chocolate Coatings —'Petpro' is now available to U.S. and Canadian Food Manufacturers.

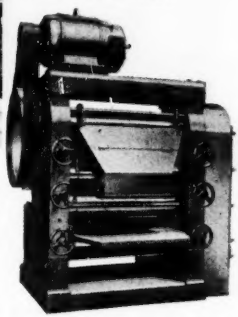
Made from the highest quality materials including sugar, milk solids, pure vegetable fats. 'Petpro' Chocolate Coatings are ideal for Gateaux, Biscuits, Ice Cream, etc.

Two outstanding features of 'Petpro' Chocolate Coatings lie in their exceptional gloss and rapid setting time resulting in much speedier production for enrobing work and reduced overheads.

'Petpro' Chocolate Coatings contain no fat substitutes or synthetic sweetening agents and are simple to use either alone or with thinners.

Stringent laboratory tests are made to ensure and maintain the highest standard of purity both before and after manufacture and the strictest hygienic conditions are maintained in the factory.

Much of the success of 'Petpro' Chocolate Coatings is due to their modern plant of special Chocolate Refiners one of which is illustrated. These are operated by skilled personnel under expert supervision.



Let us send you a sample of 'Petpro' Chocolate Coatings to test under your own conditions.

PETPRO

CHOCOLATE COATINGS

(MILK OR PLAIN)

Let us send you a sample of 'Petpro' Chocolate Coatings to test under your own conditions.

Enquiries invited from first-class distributing houses

PETTINGILL PRODUCTS LTD
MITCHAM · SURREY · ENGLAND
Cables: Petpro, Mitcham, England.

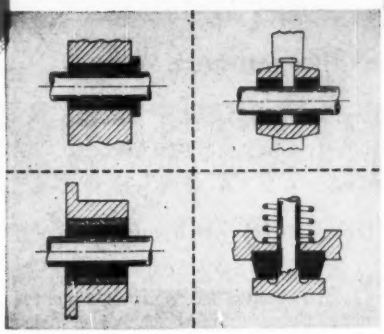
PETPRO

non-contaminating

MORGANITE

SELF-LUBRICATING

BEARINGS



— for pumps, mixers, grinders, agitators, food and enameling oven conveyors, etc.

Here's a practical solution to problems of contamination caused by conventional lubrication. Morganite Self-Lubricating Bearings require no attention—never need oil or grease because the lubricating qualities are inherent in the material itself. These bearings impart no taste or odor, are unaffected by chemicals and most acids and are completely efficient at relatively high speeds and temperatures. Find out, now, how Morganite can cut your maintenance costs, reduce shutdowns of production equipment.

Also available for general industrial purposes, Morganite can be supplied in various grades for seals, rings, vanes and other applications. All are self-lubricating, self-lapping and polishing.

SEE OUR CATALOG in Sweet's File for Product Designers. Call or write for complete engineering data or recommendations on specific problems. Estimates will be supplied promptly on receipt of specifications.

See our CATALOG in SWEET'S FILE

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Morganite INCORPORATED

LONG ISLAND CITY 3, NEW YORK

Manufacturers of CARBON MOTOR and GENERATOR BRUSHES, CARBON PILES and SELF-LUBRICATING CARBON SPECIALTIES

from noodles

to nylon!

process men value

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The MODERN heat transfer medium

In hundreds of industries where processing operations require constant and accurate temperature—DOWTHERM® has proved invaluable in providing *and controlling* the required heat at low pressure.

Process men know that uncontrolled heat can mean spoiled batches, equipment replacement . . . and lowered profits. Not so with DOWTHERM! This modern heat transfer medium prevents hot spots, saves time, prolongs the life of materials and equipment—and brings to high-temperature processing operations a hitherto unknown safety.

If your operations require precise, low-pressure heating in the 300°—750°F. range, write to Dow for complete information about DOWTHERM.

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DOW
CHEMICALS
INDISPENSABLE TO INDUSTRY AND AGRICULTURE

Foolproof Control

—Continued from page 80

enabled production of chocolates during hot and humid months, thus leveling out manufacture of these candies. Temperature of this room is maintained at 60 to 65 deg. F. and the relative humidity at 40 to 45 percent.

Formerly, the company was unable to make chocolate candies during the Summer months. And when operations started up in the Fall, production had to be built up to a high peak to meet orders. The new system smooths the factors of seasonal employment and high labor turnover.

Producing Candy Corn

High-speed has been engineered into the candy-corn line, on which creams are deposited into starch trays at the rate of 14 per min., or 11,000 lb. per 8-hr. shift.

Employed are triple depositors, the additional units being driven from, and synchronized with, the first machine.

Let us describe the steps taken in the manufacture of starch-cast candy-corn creams:

Trays containing starch and already-set centers are fed to a Mogul machine and emptied. Centers are separated from the starch and chuted from the side of the machine. Reconditioned starch is refilled into the trays, and the surface of the starch is leveled. Impressions (wedge shaped) are formed in the starch—20 rows with 60 impressions per row. White creams are forced into the impressions, 240 at a time, by a four-pump depositor. Trays continue to the second depositor that adds the orange cream. Yellow cream is cast into the molds by the third depositer. Finally, the trays are stacked and transported to the drying room.

Making Jelly Gums

Produced on a high-volume basis are the gum candies, such as drops, rings, and jelly beans. Manufacture of these items is carried out in this manner:

Corn syrup and liquid sugar are metered into steam-jacked kettles and a starch-slurry is added. After a batch is cooked to 242 deg. F., it is pumped into the hopper feeding two Mogul machines. Gum candies are then single-pump deposited into starch trays that are automatically stacked and transported to a 140-deg. F. drying room. The next day, trays of gum candies are removed from the drying room and held 72 hr. at room temperature.

Development of a company-designed grader for removing over- and undersize candies prior to the panning opera-

tion is another outstanding measure engineered for quality control. Oversize candies comprise double or miscast pieces. Candies with tips broken off when knocked out of starch trays fall in the under-size category.

Now to the operation of the grader: Confections such as jelly beans or chicken corn are chuted two floors from the Mogul machines. Staggered, rubber-faced metal baffles in the chutes cushion the fall of the candies so as to prevent breakage.

From the chutes, the candies fall into a hopper feeding the grader. Candies travel over two vibrating screens in succession. The first screen, of ¼-in. mesh, removes small or undersize pieces. Over-size pieces are separated from the candies in a second, $\frac{7}{8}$-in. mesh screen. Proper size candies fall through the screen and are chuted to a tray-loading station, ready for the panning operation. The over-size pieces are chuted from the top of the screen and collected into drums for reclaiming.

Jelly-gum candies that are not panned go to an automatic sugar-sanding machine. Candies move through a steaming chamber and a sugar-sanding dr m. Coming from the sanding machine, the candies are cooled on a 200-ft. wire-mesh belt carrying them into the air-conditioned packaging room.

These candies are then diverted to two packaging lines. On one line, girls fill the candies into cellophane bags with a special tapered aluminum scoop. Bags are then check-weighed and the open-ends are heat-sealed.

On the other line, candies are scoop-filled into window-cartons that are then end-sealed with Scotch tape. During the hot and humid summer months, these cartons are machine-wrapped with heat-sealable cellophane.

As for the panned goods, they are filled into cellophane or polyethylene bags by three Triangle machines, each with two scales and one filling spout. Bags are then heat-sealed.

Crystallizing Candies

Uniform quality crystallized creams are mass-produced in a separate department. Here, 34 deg. Bé syrup is prepared in 3,300-lb. capacity steam-jacketed kettle. The syrup is then pumped into triple compartmented tanks. Cooling of the syrup to 100 deg. F. takes place in the top compartment.

Cooled syrup then flows into the middle compartment, where the creams are crystallized. Into the super-saturated syrup go 200 wire baskets, each containing approximately 11 lb. of cream candies.

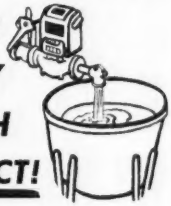
After the candies have been immersed

1/8" HERE
BOTCHES THE BATCH BY A GALLON

Why risk it?

PUT IN ACCURATE, CLEAN NEPTUNE METERS AND

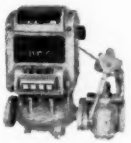
MAKE EVERY BATCH PERFECT!



Inaccurate liquid measurements can add up to tremendous waste of materials, time, and effort—to say nothing of lost quality. For instance, it's tough to read a gauge stick down inside a 4-ft. tank, yet an error of just ⅛ in. means a whole gallon too much or too little liquid added.

For formula-perfect batches time after time — automatically — put a Neptune Auto-Stop Meter in every liquid supply line. The operator pushes buttons to set the quantity desired, opens the valve, and the Auto-Stop shuts off at the right point—accurately—keeping your inventory and production figures for you as it goes along.

Neptunes have greater accuracy, longer life and lower maintenance because they're simpler, cleaner, precision built. Many types available for any liquids where sanitary or corrosion factors permit composition bronze.



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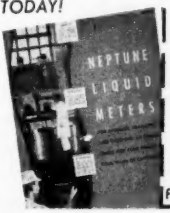

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for 12 hr., the syrup is drained from the candies and collected into the third tank, then is pumped into the steam-jacketed kettles for re-use. Crystallized candies are packed in wooden trays that are delivered to the packaging department.

End (*Resume reading on page* 81)

Tips on Condemnations

—*Continued from page* 81

structural repairs, painting, substitution of metal equipment for wooden equipment, rodent control, and any other improvements recommended by the sanitarian and achieved by management.

Frequently, when management has made a bona fide effort to comply with the best commercial practices in the industry, no prosecution will follow, even when a violation has occurred. The Statute specifically relieves the administrator of the duty of prosecution or injunctive proceedings—if, in the administrator's opinion, a suitable written notice or warning will adequately serve the public interest.

Public Health Foremost

Accordingly, the manufacturer will best serve his own interests by thoroughly preparing for the hearing, with aid of his counsel and sanitarian. For a dismissal at this stage entails no unfavorable publicity. The public interest will also be served, because few manufacturers, once alerted, will fail to make the necessary improvements. In any case, the owner, or his counsel, should request copies of the hearings held.

The National Sanitation Foundation offers the following definition:

Sanitation is a way of life. It is the quality of living that is expressed in the clean home, the clean farm, the clean business and industry, the clean neighborhood, the clean community. Being a way of life, it must come from within the people; it is nourished by knowledge, and grows as an obligation and an ideal in human relations.

And proper sanitation in food processing is vital to the public welfare. A modern manufacturer should be cognizant of his duty and should discharge his responsibility to the public in such a way as to cast credit on his product.

Above article is a sequel to Author James J. Winston's feature, "7 Steps to Effective Plant Sanitation" (p. 109, July FE).

End (*Resume reading on page* 82)

Fillet Breading

—*Continued from page* 145

prepared in a 60-qt. Hobart mixer. This batter is poured into a 20-qt. stainless steel rectangular dipping pan located at the beginning of the breading line. Two girls, each flanking the dipping pan, immerse the fish in the batter, then feed them onto the layer of bread crumbs on a 2 ft.-wide by 3 ft.-long plastic conveyor belt. This belt carries the fillets through the aluminum breading machine.

How Machine Works

Here's a step-by-step account of the operation of the breading machine:

Bread crumbs (from a local bakery) are dumped into the machine's floor-level hopper. They are next bucket-conveyed 6 ft. into a second hopper directly over the conveyor belt. From this hopper, the crumbs are gravity-fed into a rotary conical sifter, perpendicular to the belt and at a slight incline. This sifter is designed to eliminate lumps in the recovered crumbs. It is divided into two different size screens—¼ and ½-in. mesh. A horizontal, wooden paddle-type agitator prevents packing of the crumbs as it rotates in the sifter.

Leaving the sifter, the crumbs are chuted through an adjustable gate onto an aluminum, square-toothed roller. As the latter rotates, it throws crumbs onto the belt well ahead of the roller to form a 2-in. bed. At the same time, it sprinkles crumbs on top of the fillets, placed on the crumb bed, during their travel to and under the roller.

Breaded fillets then pass under a smooth-faced roller that uniformly presses the crumbs to the fillets. The conveyor discharges the breaded fillets onto a slide grid. At this point, crumbs remaining on the belt are chuted to the floor-level hopper of the breading machine, later to be bucket-conveyed to the sifter and re-applied.

Packing Details

Two girls then pack the breaded fillets into metal trays, each holding about 10 lb. Trays of the product are pushed along a roller conveyor to the packing station. Here, eight girls weigh the breaded fish and pack them 12 oz. to a carton. Next, the cartons are machine-wrapped with printed, heat-sealable cellophane.

Finally, the cartons are loaded onto metal trays—eight cartons to a tray and twelve trays to a rack. The racks are rolled into an air-blast freezer in which 1,300 lb. of breaded fish are frozen in 4 hr.

End (*Resume reading on page* 147)

Depend on AUTO-LITE for TEMPERATURE INDICATION

Model "V" is one of many Auto-Lite dial thermometers made for industry. The outline drawings show how this temperature indicator can be adapted to meet specific needs through various standard mountings. Send for our new Catalog No. G-143-B of Auto-Lite dial indicating and recording thermometers.

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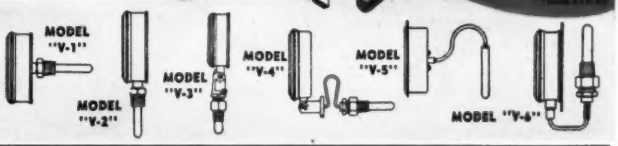

Spend Weighing Equipment Dollars Wisely...

EXACT WEIGHT Scale Model #708-P check - weighing consumer bags. T. E. Wilde & Son, Inc., Sacramento, Calif.

The facts are that practically everything processed uses scales. Such operations as ingredient compounding, laboratory work, blending, packaging and production line checkweighing are the most common uses in the food industry. Many food products owe their uniformity and goodness to sound scales. Engineers entrusted with profitable production now generally agree the weighing element is one of the most vital cost control measures at their disposal. This is why weighing equipment dollars should be spent wisely. Few individual equipment requirements do more to improve quality than the right weighing units in the right place and no weighing equipment is better than EXACT WEIGHT Scales. Today these famous scales are doing more varied jobs, in more plants, in manual, semi-automatic and fully automatic operations than ever before. Their capacity to save time, money, product and labor are well recognized by men responsible for volume production everywhere. Write or call us about your job.

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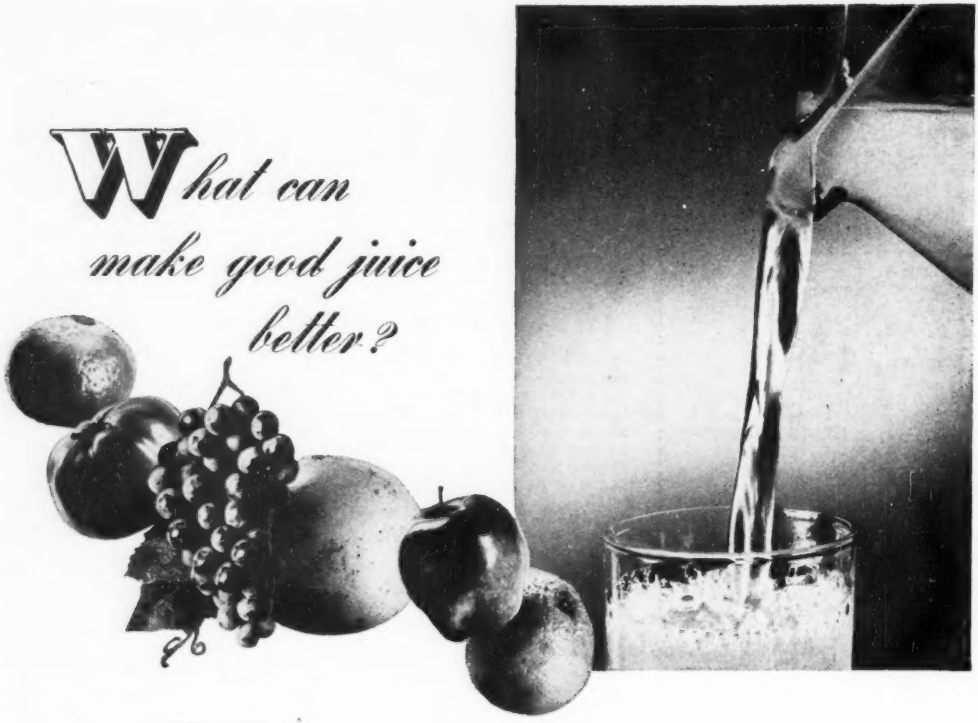
What can make good juice better?



PROBLEM: Consumers expect to receive the same amount of vitamin C regardless of the type of juice they drink. But there is a big difference between juices (see table at right).

SOLUTION: It is in the public interest to standardize the vitamin C content of all of these juices, whether canned, frozen, or concentrated. A label claim for 100% of the minimum daily adult requirement may be made when the juice contains 30 mg. of vitamin C per serving.

Make your product better and you can expect to sell more of it. We're ready to help you. Write us today.

ASCORBIC ACID CONTENT OF CANNED JUICES

Below are examples of minimum and maximum levels of ascorbic acid in commercially canned juices. Note the wide variations! All figures are in milligrams per 100 grams of juice. Data from U. S. Department of Agriculture.

	Min.	Max.
Grapefruit juice	10.0	49.0
Orange juice	9.7	70.0
Pineapple juice	5.4	18.0
Apple juice	0.2	3.6
Grape juice	0.0	4.7
Tomato juice	2.5	32.0

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ADVANCES IN TECHNOLOGY

Quality of Breads From Quick-Frozen Doughs Is Influenced by Variations in Ingredients

Extending the study of quality of breads made from frozen yeast doughs, tests have been made on formulas with variations including two levels of fat, 2.5 and 12.5 percent; two types of yeast, dry and compressed; and two types of liquid, whole fresh milk and water.

Formula variations included: (1) Compressed yeast, whole fresh milk, and 2.5 percent fat; (2) dry yeast, whole fresh milk, and 2.5 percent fat; (3) dry yeast, water, and 2.5 percent fat, and (4) dry yeast, whole fresh milk, and 12.5 percent fat. Doughs were quick-frozen and stored at minus 10 deg. F. for periods from 1 day to 8 weeks. Breads were measured for volume and scored for quality after 1 day, and 1, 4, and 8 weeks of storage.

Volumes of breads made with dry yeast, milk, and 2.5 percent fat were significantly higher than those made with compressed yeast; and the volumes of the latter were significantly lowered after one day of frozen storage. The volumes of breads made from formulas containing dry yeast, milk or water, and 2.5 or 12.5 percent fat were not significantly affected by storing in the frozen state for a period of 8 weeks.

Quality scores of all breads made from frozen doughs were considerably lower than those of the fresh controls, and grain was coarser and less uniform. Also, a heavy layer was present in 80 percent of the loaves after one week of frozen storage, and 20 percent of the samples had a yeasty odor. All breads made from frozen doughs were of poor quality regardless of the length of time of freeze. No consistent difference was noted in breads from formulas containing milk or water as the liquid. Increasing the fat content from 2.5 to 12.5 percent lowered the quality scores.

Digest from "The Effect of Certain Variations in Fat, Yeast, and Liquid on the Frozen Storage of Yeast Doughs," by M. V. Zaehringer, H. L. Mayfield, and L. M. Odland, *Food Research*, 353-59, July-August, 1951.

FRUITS AND VEGETABLES

Moisture Content of Prunes Controls Mold Development

Prunes canned with a moisture content of 37 percent or less will remain mold-free for at least 2 weeks after cans are opened and the contents exposed to infection.

This was determined when 1-lb. cans of d'Agen prunes containing 31.2, 36.1, 39.4, and 42.6 percent moisture were opened, the prunes transferred in lots of 10 to sterile Petri dishes and exposed to natural infection at room temperature for 24 hr., then covered and incubated at 77.9 F. Subsequently, the fruit was examined daily for mold development.

Eight days after commencement of the experiment, mold growth was visible to the naked eye on the fruit of highest moisture content. After 15 days, all fruit with 39.4 and 42.6 percent moisture were covered with mold, and 3 days later fruit with 36.1 percent moisture were also moldy. The low-moisture fruit was mold-free at the conclusion of the experiment—21 days after exposure. Since the contents of a can of prunes are consumed in less than 2 weeks after the can is opened it is concluded that the recommended new upper limit of 37 percent moisture in No. 10 cans of d'Agens prunes is satisfactory.

Digest from "Mould Development in Canned Prunes," by J. D. Bryden and L. F. Mandelson, *The Agricultural Gazette* (Sidney, Australia), 297-300, Aug. 28, 1951.

Flat-Sour Bacterial Growth Not Prevented By Subtilin

Recent experiments in the use of antibiotics to prevent bacterial survival lead to the conclusion that subtilin is not effective in preventing growth from the spore state of flat sour bacteria. A combination of subtilin and mild heat treatment was found ineffective for the complete destruction of spores of a number of obligate and facultative thermophilic flat-sour bacteria.

Organisms used in the current tests comprised 20 strains of obligate thermophilic flat-sour bacteria, and 10 strains of facultative types. Spore suspensions were prepared from pure culture isolations of each strain. Tubes of a peptone medium were prepared with various concentrations of subtilin and seeded with 30,000 spores. Duplicate tubes were incubated at 131 F. with and without heat treatment at 212 F. Periodic observation was made of spore germination and growth. The resulting data indicated that subtilin was not effective in preventing the survival and growth of these bacteria.

Digest from "The Effect of Subtilin on Thermophilic Flat-Sour Bacteria," by O. B. Williams and L. L. Campbell, Jr., *Food Research*, 347-52, July-August, 1951.

CONFECTIONERY

Emulsifiers Improve Coatings For Army Candy Rations

Addition of certain non-ionic surface-active agents, termed emulsifiers, to hydrogenated vegetable fats will yield cocoa-type coatings for confectionery rations that meet the rigid specifications of the Armed Forces. Requirements of the latter are that coatings must be stable for long periods of time in temperatures up to 120 F., free from bleeding and sticking to wrappers, and, at the same time, palatable and nutritious.

The following emulsifiers gave the

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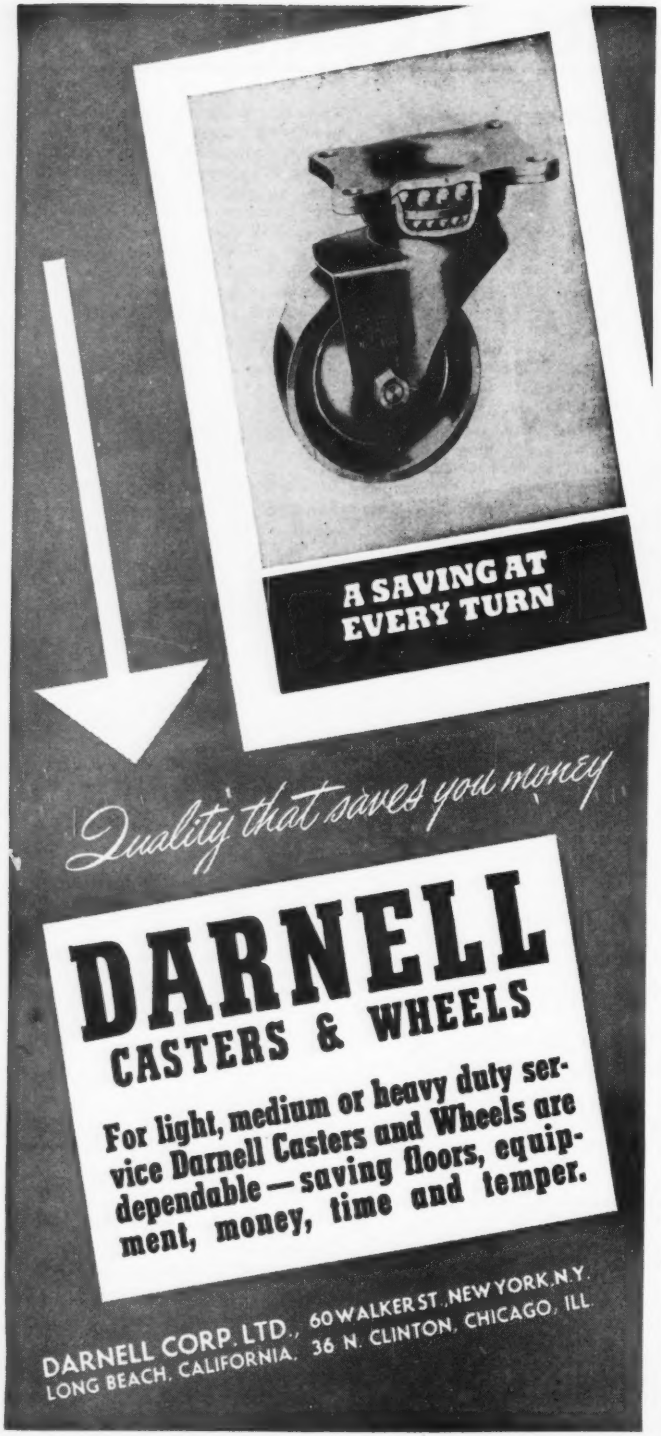
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desired improvement: Sorbitan monostearate, S60, sorbitan tristearate, S65, polyoxyethylene sorbitan monostearate, T60, polyoxyethylene sorbitan tristearate, T65, polyoxyethylene sorbitol hexaoleate, polyethylene glycol 400 monostearate, carbo-wax 1,000 monostearate, monoglycerol monostearate, and lecithin.

Used in combinations or alone, these emulsifiers showed varying degrees of effectiveness in improving resistance of vegetable fats to heat. The two most effective were: No. 1, one percent of a 50-50 mixture of S60 and T60; and No. 2, 0.25 percent each of S60 and T60 and 0.1 percent polyoxyethylene sorbitol hexaoleate. They produced the unexpected result of upgrading the melting points of the vegetable fats.

Addition of non-fat milk solids to the coating resulted in confections that not only withstood higher temperatures, but also eliminated the waxy, shortening taste. Even though the melting point of the fat used is higher than body temperature, the emulsifiers tend to incorporate it into a creamy mass with the confection, producing a palatable and nutritious ration. The coating does not stick to the wrapper and has no greasy feeling.

Digest from "Improvement of Cocoa-Type Coatings for Use in Army Rations," by J. J. Alikonis and K. T. Farrell, *Food Technology*, 288-90, July, 1951.

FISH

Vitamins From Fish Liquor

Herring-press liquid appears to be a favorable source material for the production of Vitamin B_{12} by fermentation with *Streptomyces griseus* or *S. aureofaciens*. Experimental fermentations were carried out in sterile liquid containing two μg. of cobaltous ions per ml., inoculated with growth from a 2-day nutrient agar culture of a *Streptomyces* species, then aerated vigorously with sterile air at 82 F. Vitamin B_{12} increased from 50 to 120-140 millimicrograms per ml. in 2 days of fermentation and to 220 in 4 days. There was some difference in output with various species of *Streptomyces*.

Dilution of the liquid to 2 percent solids (from 7.8 percent) increased yields. Thus *S. griseus* ATCC 10137 produced 480 millimicrograms of B_{12} per ml. of the diluted medium in 4 days of fermentation. Products were assayed by the *Lactobacillus leichmanni* method or by a cuplate technic using a vitamin B_{12}-requiring mutant of *Escherichia coli*. Direct assay of crude fermentation products

(*Turn to page* 177)

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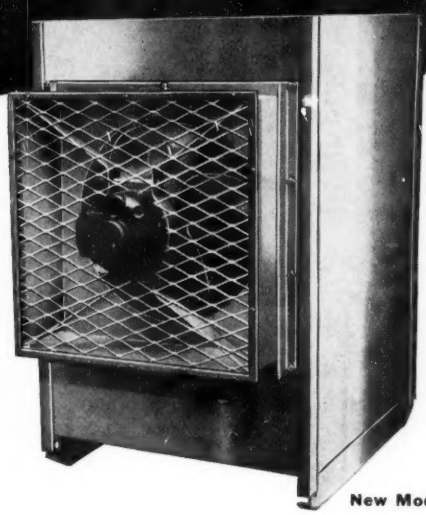
New Model 23



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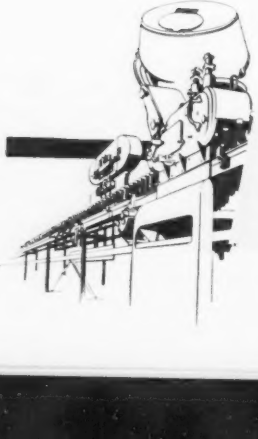

To see why the finest of all closures is also the most economical, consider the catsup situation—and one of the greatest lessons catsup teaches.

"VAPOR-VACUUM

CATSUP LESSON NO. 1

Utility after opening

It's the service a catsup package gives after opening that makes it unbeatable. Other products may not offer quite as spectacular an opportunity—but the same principle always applies. Whatever the product, *any increase in after-opening utility will help sales!*

CATSUP LESSON NO. 2

Resealing... an ever-present challenge

Some foods may not call for such repeated re-sealing as catsup, but any food in glass is better off if it has a truly efficient re-seal. Often, a tight re-seal is the only way to maintain full freshness and flavor throughout the use-life of the package.

That's why catsup, the product with the greatest need for re-sealing, practically always uses Vapor-Vacuum.

CATSUP LESSON NO. 3

Color preservation

A big part of catsup's success in self-service selling is due to the invariable freshness of its color. Being *Vapor-Vacuum Sealed*, that luscious color never varies, never darkens.

There was a time when catsup color wasn't so lasting. But that was *before Vapor-Vacuum*.

Moral: *color, the great salesman, needs Vapor-Vacuum to keep it effective.*

CATSUP LESSON NO. 4

Economy in Production

In the packing plant, as in the food store, catsup is still the great teacher. Catsup, one of the top-volume, peak-load packaging jobs, is almost universally packed under the principle that *the finest of all seals is, in the long run*, the most economical by far!

Standard of the Highway

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INTERNATIONAL **TRUCKS**

"Standard of the Highway

may not yield reliable results, partly because of presence of antibiotics produced by the mold, and separation by paper chromatography is recommended before assay.

Digest from "Microbiological Formation of Vitamin B_{12}. I. Production in Fish Press Liquid," by H. L. A. Tarr, *Canadian Journal of Technology*, 391-400, August, 1951.

DAIRY

Solar-Activated Flavor Of Homogenized Milk

Development of off-flavor in homogenized milk exposed to daylight is caused by a whey constituent, referred to as a minor-protein fraction, isolated from skim milk after the major proteins have been removed. This is the conclusion of a series of investigations in which inquiry was made into (a) susceptibility of individual cow's milk; (b) the role of oxidation and the effectiveness of antioxidants; (c) effect of deaeration, surface area of fat globules and relation of the Kreis test, and (d) isolation of a whey constituent capable of producing the solar-activated flavor.

In the examination of milk from individual cows no correlation was found between breed, stage of lactation, and fat percentage and the susceptibility of the homogenized milk to develop solar-activated flavor. About 30 percent of the milk from individual cows on pasture failed to develop characteristic off-flavor following pasteurization, homogenization, and exposure to sun for 30 and 60 min.; but milk from all cows on dry feed was susceptible to solar activation.

In determining the role of oxidation in the development of solar-activated flavor in homogenized milk, certain antioxidants were tested. Ascorbic acid had no preventive effect. Nordihydroguaiaretic acid alone or in combination with ascorbic acid prevented the off-flavor development. Alpha tocopherol and hydroquinone, separately or in combination, did not offer complete protection; but hydrogen peroxide was effective in preventing typical solar-activated flavor. Heat treatment at 176 F. for 5 min. proved ineffective.

Deaeration studies indicated that the development of solar-activated flavor in homogenized milk results from an oxidative process. Increasing the surface area of the fat globules by homogenization subsequent to exposure to daylight accentuates the development of off-flavor and indicates that the surface area of the fat globules is a factor in its development. Definite correlation was not obtained in all cases between a positive organoleptic taste sensation of the solar-activated flavor and a positive Kreis reaction.

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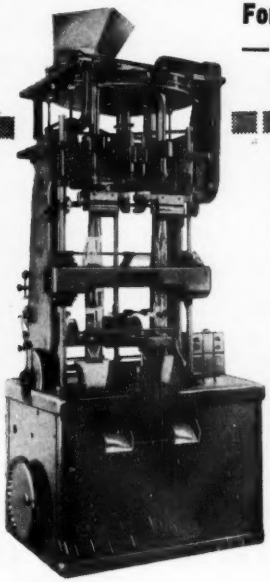

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Remember, too—Transwrap actually gives you a *better* package . . . smarter-looking, faster-selling. A package that *seals in* the fresh flavor and quality of your product—and *seals out* damaging air, vapors and moisture. You *can't* afford *not* to investigate Transwrap for your packaging economy. Do it today—*now!*

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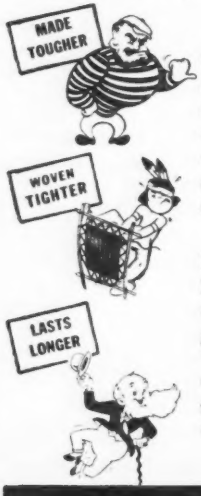

Here's the conveyor belt that was specially designed for the *sanitary* handling of food! It's impervious to oils, greases, acids, alkalies and moisture, and can withstand temperatures from —20° to 200°F. PLASTEX won't absorb or exude ANY ODORS and can be easily and quickly cleaned by any method . . . including steam! It's fully pliable, requires no special care and will last longer than *any ordinary, untreated belt!*

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NEW YORK PHILADELPHIA CHICAGO DETROIT SAN FRANCISCO

In isolating the factor which proved to be responsible for the typical off-flavor, freshly separated skim milk was coagulated with rennet at 80 F. The separated whey was heated to 203 F. for 1 hr. to remove heat-coagulable proteins. The mixture was filtered and centrifuged, and the clarified serum treated with ammonium sulphate. The resulting precipitate was washed, centrifuged, and dialyzed, and the non-dialyzable fraction dried from the frozen state under high vacuum. Aquasols of this powder were readily sensitized to produce the typical solar-activated flavor of homogenized milk. Elementary analysis, amino acid composition, isoelectric zone and minimum molecular weight have been determined. An electrophoretic study of the fraction will be made later.

Digest from "The Solar-Activated Flavor of Homogenized Milk. I. Susceptibility of Individual Cow's Milk," by B. R. Weinstein and G. M. Trout; "II. The Role of Oxidation and the Effectiveness of Certain Treatments," *Ibid.*; "III. Effect of Deaeration, Surface Area of Fat Globules and Relation of the Kreis Test," *Ibid.*; "IV. Isolation and Characterization of a Whey Constituent Capable of Producing the Solar-Activated Flavor." By B. R. Weinstein, C. W. Duncan, and G. M. Trout, *Journal of Dairy Science*, 554–70, June, 1951.

ENGINEERING

Deep-Sea Fishing Aided by Echoes

Outstanding among all advances made in the fishing industries is the introduction and use of the echo sounder. This device has long been used as an aid to navigation in measuring depth of water and determining the contour of the bottom. Experience has shown, however, that the echo sounder will not only indicate the depth and contour of the bottom, but also the density of reflective matter between the surface and the bottom, such as a school of fish.

Both indicating and recording types of equipment are made, the latter being preferable. Depth is determined by measuring the time required for a sound to travel from the boat to the bottom and back again.

Although much is yet to be learned about the characteristics of underwater reflective material, the following facts have been determined: Light patches of vegetation will not be indicated; nor will sponge and soft coral be detected unless in considerable mass. Wrecks, however, will be detected, with steel producing a stronger echo than wood.

Pelagic fish, either near surface or at depth, will be indicated; and the penetration of the sonic energy into the school will give an immediate idea of its density. All types of fish that

school closely can be located with a sonic depth recorder, and much of the guesswork can be taken out of prospecting new fishing grounds. The instrument is useful also to gill-net fishermen and trawlers, and it has found application in trolling, set-line fishing, shrimp fishing, and live-bait fishing.

Digest from "Use of Echo Sounders in the Fisheries," by Ewing Lawrence, Jr., *Commercial Fisheries Review*, Vol. 13, 1-5, March 1951.

FERMENTATION

Brewing Value of Hop Extracts Exceeds That of Fresh Hops

Extracts of hops have been proposed as a more stable form for storage than the hops themselves, but have had only limited use, partly because the results of replacing fresh hops with extracts have been conflicting, and partly because actual savings of fresh hops by use of extracts has been hard to prove.

Occasionally, however, reports have been made that hop extracts were more than equivalent to fresh hops in bittering value, and it was argued that the extraction process was more efficient in dissolving hop bitter than the usual boiling in the kettle.

To test this hypothesis, 98 kg. of Hallertau hops were comminuted and extracted three times with an organic solvent boiling at 108 F. The hops were then freed of solvent and extracted with water and steam. The two extracts were evaporated to pasty consistencies and combined to obtain a total of 43.75 kg. About 72 percent of the total resins of the hops appeared in the extract, including 81 percent of the soft resins, 69 percent of the humulon, and 72 percent of the lupulon. About 40 percent of the volatile oil was also found in the extract; the remainder distilled over with the organic solvent.

On using the extract as hopping material for wort, a greater bittering effect was obtained than for an equivalent quantity of fresh hops. The brewing value was established at 4 times that of fresh hops, that is 1-lb. of extract was equal to 4-lb. of fresh hops. Since 1-lb. of extract was obtained from 2.25 lb. of hops, this represents a sparing of 44.2 percent of fresh hops.

Beer from wort hopped with extract plus fresh hops could not be distinguished from that hopped entirely with fresh hops. However, that hopped with the extract alone did not have normal flavor, suggesting that the flavor of beer hopped by boiling is due in part to extractives not obtained by the process used in making the con-

Here's what
IN-PLANT CHLORINATION can do

"Member of National Canners Association"

BAKER CANNING COMPANY

Theresa, Wisconsin

April 4, 1949

PACKERS OF NUMBER 10 TINS
Wisconsin Quality
. . Peas . .
Whole Kernel Corn
Address all Communications to Theresa, Wisconsin

Wallace & Tiernan Co., Inc.
Newark 1, New Jersey

Gentlemen:

We have been using In-Plant Chlorination for a few years, and feel that this piece of equipment is just as important in a canning factory as any other piece of equipment used in the processing of canned foods.

The first year we installed In-Plant Chlorination we had chemists make bacteria counts, and checks at approximately fourteen points throughout the plant, such as picking table belts, flume systems, washers, blanchers, fillers, closing machines etc. In making these tests we did not use In-Plant Chlorination for one week, and the next week we used In-Plant Chlorination in order to make comparisons as to bacteria count.

The reduction in bacteria count, between the two operations is almost unbelieveable. We found that by using this equipment properly, and increasing the dosage at clean-up time, we eliminated bacteria at many of the check points. One cannot, however, install In-Plant Chlorination and forget about a good housekeeping job. This would be an error, indeed.

However, by having In-Plant Chlorination, and doing a good job of house-cleaning, one can eliminate the building up of bacteria in most any piece of equipment. We do find that by using In-Plant Chlorination the clean-up time necessary at clean-up periods is practically cut in half.

You may use this letter in part or in full - for any purpose you care to.

Yours very truly,

BAKER CANNING COMPANY

By Robert Baker

RDB:eal

In-Plant Chlorination, engineered by Wallace & Tiernan, can help your plant, too. Bacterial counts are reduced, odors controlled, and on-the-line time for processing equipment increased when you use this proven method.

Call your nearest W & T Representative now for complete information.

Other services by Wallace & Tiernan Associated Companies include Merchen Feeders for precision blending BY WEIGHT; Richmond Sifters for all separating problems involving powdered or ground materials; and Richmond Permaflux Magnets for the complete elimination of any ferro-metallic contamination of your food line.

WALLACE & TIERNAN COMPANY, INC.
CHLORINE AND CHEMICAL CONTROL EQUIPMENT
NEWARK 1, NEW JERSEY • REPRESENTED IN PRINCIPAL CITIES

I-33

"Largest Ready-To-Eat-Cereal Company in the World"

Modernizes with **DAY**

DUST CONTROL—MATERIAL HANDLING

From a small one-room corn flakes plant, operated by W. K. Kellogg, soon after the turn of the century, has sprung the Kellogg world wide ready-to-eat-cereal enterprise with plants in Battle Creek, Michigan; Omaha, Nebraska; Canada; Great Britain; Australia; South Africa and Mexico. Today, the Kellogg Company manufactures nearly a dozen different ready-to-eat-cereals, and in addition, dog, poultry and stock feeds. Kellogg products are known and distributed throughout the world, and the company has become known as the "Largest Ready-To-Eat-Cereal Company in the World."

In a recent modernization program at Kellogg's large Battle Creek, Michigan plant the DAY Company was selected to engineer, manufacture and install dust control, material handling and storage equipment. The total project included the following:

DUST CONTROL FOR CORN AND WHEAT CLEANING: A turn-key job which included DAY Type "AC" Dust Filters with proven dust collection efficiencies of 99.99% and better; the widely accepted DAY Dual Clone Dust Separators which assure maximum centrifugal dust separation, and DAY Exhausters designed for highest efficiency in dust control applications.

MATERIAL HANDLING: DAY self-cleaning Pneumatic Conveyor system was installed for fast, dust-free grits conveying.

CEREAL STORAGE: For use in the storage of Rice Krispies, DAY fire and vermin proof, non-bridging bulk storage bins were supplied. These bins are furnished in either heavy, galvanized black iron or stainless steel.

LEADING COMPANIES RELY ON DAY

Records show that most of the nation's leading millers and many food processors depend upon DAY. According to a national survey, DAY dust control equipment is the predominant choice, with DAY leading its nearest competitor in this field of dust control by a margin of 10 to 1.

DAY EXPERIENCE CAN SOLVE YOUR DUST CONTROL PROBLEMS

This achievement record, plus the experience gained by The DAY Company in engineering, manufacturing and installing dust control systems for food processing plants since 1881 is of great importance to you. It means that when you call upon DAY, you benefit from their 70 years' experience. No other dust control manufacturer can even approach DAY's accumulated knowledge in this specialized field. Regardless of your dust problem, DAY can provide an effective and economical solution. For engineering assistance and cost estimates, Write-to-DAY!

DAY SINCE 1881

The **DAY** *Company*

817 Third Avenue Northeast, Minneapolis 13, Minnesota
IN CANADA: P. O. Box 700, Ft. William, Ont.
Branch Plants in Fort Worth, Buffalo and Welland, Ont.

centrate. Boiling for 40 min. was necessary to get the full effect of the extract.

Digest from "The Question of Partial Use of Hop Extracts in the Manufacture of Beer" by Ernst Schild and Wolfgang Riedl, *Brauwissenschaft 1951*, No. 2, 21-26, and No. 3, 38-43.

CONTROL METHODS

Specific Heat of Wheat

Thermal constants of cereal grains are useful in estimating the extent of temperature changes and variations in moisture content during storage. Thermal conductivity of bulk grains has been measured a number of times, but specific heat has not been measured directly, though it can be calculated from the thermal conductivity and the thermal diffusivity.

By using a 500 ml. Dewar flask as a calorimeter and applying the method of mixtures to water at about 2 deg. C. and a capsule of wheat at 20 deg. C. immersed in it, the specific heats of three samples of No. 1 Northern wheat have been determined as functions of the moisture content of the samples. Values were 0.283, 0.288, and 0.301 for bone-dry samples, and they agreed well with the value of 0.31 calculated from other thermal constants. Two samples showed approximately the same rate of increase in specific heat with moisture, but the third increased more rapidly.

Equations for the specific heat vs. moisture content of the three samples were:

$e = (0.283 \pm 0.001) + (0.00724 \pm 0.00015)\ U$

$e = (0.301 \pm 0.001) + (0.00738 \pm 0.00012)\ U$

$e = (0.288 \pm 0.002) + (0.00828 \pm 0.00022)\ U$

where U is percent moisture in wheat, and e is specific heat of sample.

Digest from "The Specific Heat of Wheat", by P. M. Pfalzner, *Canadian Journal of Chemistry*, Vol. 29, No. 5, 261-68, May 1951.

Air Circulation During Drying Speeds Moisture Tests

Two pieces of apparatus used by German maltsters to determine moisture content of grains and meal employ air currents to remove the moisture-laden air from the immediate neighborhood of the drying material. One, known as the "Sicco-Rapid" moisture apparatus, handles a single sample and uses a thermally generated stream that passes 71 cu. ft. of air over the sample during the 10 min. drying period. A larger unit (Turbo-sicc) handles 8 samples at a time, utilizes a propeller that, at 30 rpm.,

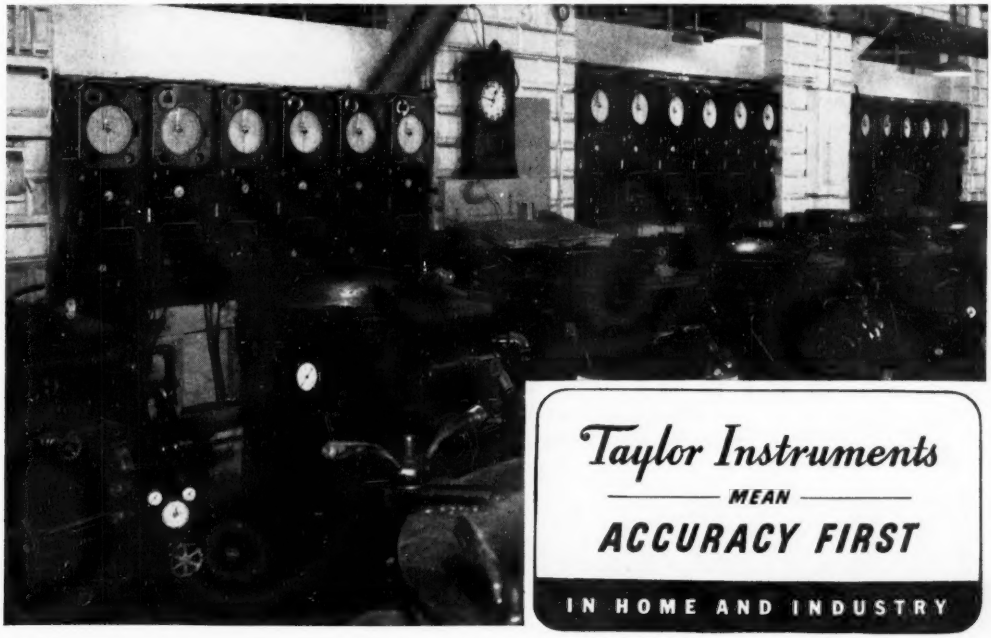
TAYLOR HELPS SEABROOK BOOST RETORT CAPACITY 20%

Up to 20% increase in production capacity! That is the record already achieved by the Taylor SP-6A Retort Control System installed on these 3-basket retorts at the Seabrook Farms Company, Bridgeton, N. J. "In addition to increasing the productive capacity of our retorts," says **Seabrook,** "the precise temperature and pressure control we get has greatly improved the quality, appearance and flavor of our canned vegetables and fruits."

Taylor's SP-6A Retort Control System is designed to handle No. 2½ cans or larger. Your operator simply loads his retorts and turns a timer dial. Then the SP-6A System gives you: **(1) Automatic venting. (2) Automatic temperature control at processing point. (3) Automatic timing of process period** with steam automatically shut off at end of this period. **(4) Automatic pressure control** during cooling by economical use of compressed air in retort. **(5) Consistently uniform cooling to a specified temperature. Termination of cooling at a specified point** with automatic blow-down and drain of retort. **(6) Signal flash** telling operator the cycle is completed.

There's a Taylor Control System to solve every processing problem. Ask your Taylor Field Engineer. Or write Taylor Instrument Companies, Rochester, N. Y., or Toronto, Canada. *Instruments for indicating, recording and controlling temperature, pressure, flow, liquid level, speed, density, load and humidity.*

Seabrook Farms Company has increased production capacity up to 20% with this Taylor SP-6A Retort Control System

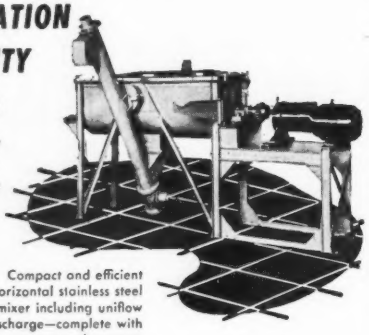


Taylor Instruments
MEAN
ACCURACY FIRST
IN HOME AND INDUSTRY

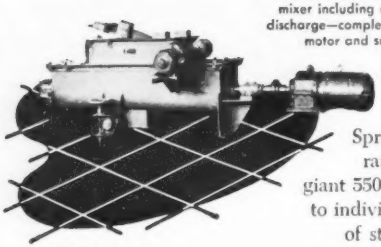
SPROUT-WALDRON

FOOD MIXERS

for SANITARY OPERATION
ABSOLUTE UNIFORMITY
SPEED
EFFICIENCY
ECONOMY



Compact and efficient horizontal stainless steel mixer including uniflow discharge—complete with motor and support.

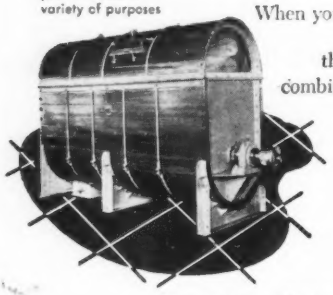


A combined sifting and mixing unit in use by a number of leading food processors for a variety of purposes

Sprout-Waldron horizontal mixers range from 2½ cu. ft. capacity to giant 550 cu. ft. equipment. Engineered to individual needs, they may be made of steel, stainless steel, non-ferrous metals, or wood. They can be jacketed for heating or cooling... lined with glass, porcelain, rubber, etc.

When you entrust your food mixing problems to Sprout-Waldron you are assured that 85 years of engineering know-how combined with outstanding manufacturing facilities will invariably provide the perfect solution.

A Sprout-Waldron representative will be glad to consult with you without obligation. Meanwhile, write for Bulletin SM-346. Address: Sprout-Waldron & Co., Inc., 35 Waldron St. Muncy, Pennsylvania



This rugged, watertight mixer of wood construction is used in many fields, including starch manufacturing.

145-A

LOOK TO SPROUT-WALDRON for BETTER PROCESSING EQUIPMENT

Sprout-Waldron
Manufacturing Engineers
SINCE 1866
MUNCY • PENNSYLVANIA

SIZE REDUCTION | MIXING & BLENDING | BULK MATERIALS HANDLING | PRODUCT CLASSIFICATION | PELLETING & CUBING

moves 1,065 cu. ft. an hour over the drying samples.

Comparison of these instruments with oven-drying shows that 20 min., at 221 F., in the moving air gives practically identical results with those obtained in 3-hr. at the same temperature in an oven. Ten min. at 230 F. gives essentially the same results as vacuum drying. The time saved is therefore considerable, and makes the instruments practical for fast work.

Digest from "Experiments With Two New Rapid Moisture Determination Apparatuses," by H. Fink, K. Woger and H. Heider, *Brauwelt*, 1951, No. 20, 388-90, May 17, 1951.

STORAGE

Refrigerated Gas Storage Extends Life of Apples

Combining a temperature of 40 F. with control of composition of the surrounding atmosphere (at 10 percent CO_2 and 11 percent O_2) prevents low-temperature breakdown and adds greatly to the length of time apples may be kept in storage, and after they are removed.

Further advantages of refrigerated gas storage are: Marked retardation in changes of skin color and texture of fruit, and elimination of damage by *Tortrix* larvae, since these larvae are quickly killed by CO_2.

In this method, advantage is taken of two facts: (1) That when apples are stored in a gas-tight chamber, they continuously absorb oxygen from the air and give off an approximately equal volume of CO_2. And (2) that this change in the composition of the atmosphere markedly retards the respiratory activity.

Composition of atmosphere in the storage rooms is controlled by admission of fresh air and by chemical absorption of excess CO_2. Fresh air may be admitted by adjustable ports or, where forced circulation of air is used to control the temperature, by a 1 in. pipe opening on the suction of the fan. This latter method assures complete mixing of fresh air with the storage room atmosphere. Control of CO_2 is obtained by passing a part of the atmosphere through a scrubber containing a solution of NaOH or $Ca(OH)_2$.

Instructions for building gas-tight chambers and scrubbers, and charts giving: (1) Susceptibility of three varieties of English apples (Bramley's Seedling, Newton Wonder, and King of the Pippins) to low-temperature breakdown, and (2) effect of temperature on production of CO_2 are included.

Digest from "The Refrigerated Gas Storage of Apples," by Franklin Kidd, and Cyril West, *The Refrigeration Journal* (London), 20-30, Feb. 1951.

3 BIG REASONS why the Most Up-To-Date Plants Prefer YORK!

1 More Economical To Install!

Static and dynamic balance to eliminate vibration permits upper floor mounting without heavy, expensive foundations.

The compact York V/W Compressor—Freon or Ammonia—requires less floor area . . . less headroom—allows you to utilize your working space more profitably.

2 More Economical To Operate!

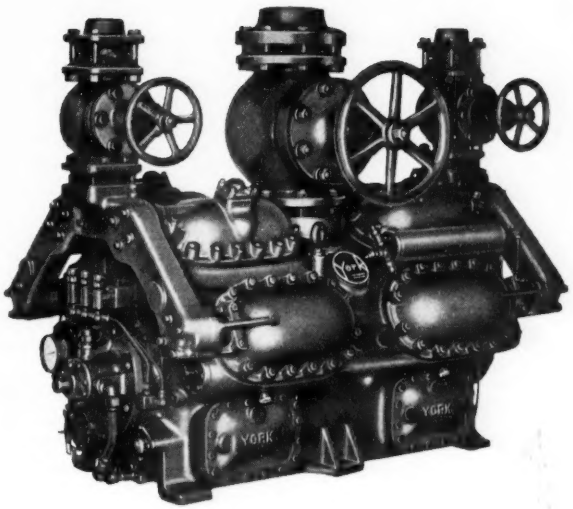
Built-in capacity reduction features mean power savings in almost direct proportion to product load. 72% power savings at 25% load. You're able to plan a more flexible and more economical product-load and man-hour schedule than is possible with fixed machine capacity.

The York V/W Compressor—adaptable as either booster or high-stage machine—provides maximum high-temperature or maximum low-temperature capacity as required.

3 More Economical To Maintain!

The York V/W Compressor's quiet, vibration-free performance assures longer life to parts . . . assures you lower maintenance costs.

What's more, all parts subject to wear are easily renewable—saving you on repair bills, depreciation and replacement.



The York V/W Compressor has proven its efficiency and economy in the food processing industry wherever cooling is needed.

Capacity ranges from 5 to 300 tons. Available in 4, 6, 8, 12, 16 cylinders. The York V/W Compressors are designed for both water-cooled and evaporative condensers.

For full details on how the York V/W Compressors can solve your refrigeration problems, see your York Representative (listed in your Classified Directory) or write to York Corporation, York, Penna.

Fruit Juices Concentrates

Frankfurters

Frozen Vegetables

Beer

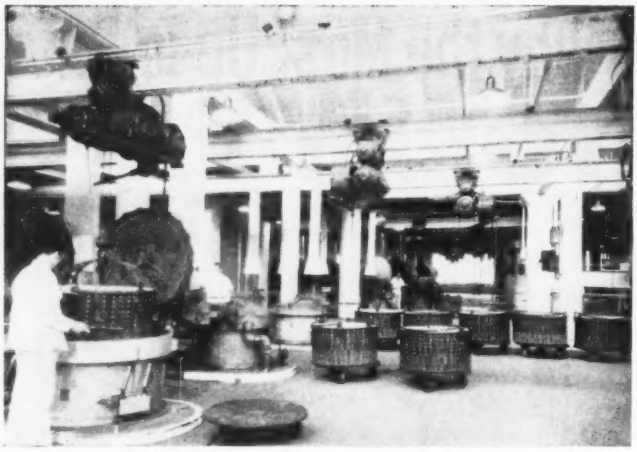
Stored Apples

Crackers

York refrigeration air conditioning

The big advances come from YORK

Headquarters for— **Refrigeration and Air Conditioning**



How to keep a hoist from growing old before its time!

The time to add years to the life of your hoist is *before you buy it!*

You can do this and avoid costly production slow-downs later if, before you buy, you estimate what the maximum and average loads are to be; how frequently your hoist will be called upon to handle those loads within a given period.

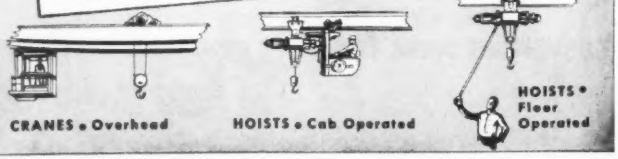
You will also want the answers to these questions: What distance is the load to be lifted and lowered, and at what speeds? How quickly must the hoist travel from one location to another to keep production at top efficiency? What temperatures are likely to prevail? Are there any corrosive influences? . . . and many others.

You can save your time now, and considerable trouble later, by asking a Shepard Niles specialist to study your problem and recommend the most economical hoist for you—in terms of your own specific operations. We invite your inquiries.

Shepard Niles

CRANE & HOIST CORPORATION

Makes and sells all three lifting tools for airborne shop loads



422 SCHUYLER AVENUE • MONTOUR FALLS, N. Y.

Operation Quality

—Continued from page 97

commercial laboratory. This method of checking is applied particularly to the control of ice cream quality.

Franchisers Keep Sharp Eye

Ice cream franchise holders regularly check on the quality of each other's products, mostly the quality of ice cream made by their immediate neighbors. Even though the product each makes is maintained exactly in accordance with formula and specifications, all holders know the certain results if their neighbor's quality slips. They are well aware of what to expect, for they know that in every area, including their own, Duncan Hines ice cream is constantly laboratory checked by competitors.

There are two other zealous policing agencies. One is Duncan Hines, himself. He has little to gain personally, and much at stake. His reputation as a connoisseur of food would be shattered if the products bearing his name slip in quality.

The other policing agency (self appointed) is the group of eating places privileged to display the sign, "Recommended by Duncan Hines". These food purveyors have flourished with the prestige of Hines' indorsement. They have a real interest in maintaining the quality of all products using the brand name, and are ready to report any deviation from the quality established or expected for any item.

Structure of Organization

A fixed fee is required for a franchise. In addition, a royalty is charged on sales. Income pays overhead, supports national advertising, and provides advertising mat service and merchandising aid for local use. A portion of the revenue is turned over to the Duncan Hines foundation, which provides scholarships for training students in food preparation. Duncan Hines, personally, receives no remuneration from the organization for the use of his name.

In addition to the scholarships, grants are made for the study of food problems and for the development of new food products and also new processing methods.

The organizers of the company, Duncan Hines and Roy Park, came to the realization that "there was no national organization adequately serving a real need—that of making such a complete line of fine foods available to those people who demand and expect consistent quality."

The philosophy of the company is: "Better foods cost more. In terms of

nutrition and eating enjoyment, they are well worth the difference". And marketing results thus far have indicated that a very large and worthwhile consumer group in this country agrees, and will willingly pay a premium price for supreme quality.

End (*Resume reading on page* 98)

Homogenizing Twist

—*Continued from page* 67

barrel. Water and melted shortening are metered into these tanks.

Our new ingredient-handling system is used only for making white doughs. It cannot be employed in the manufacture of dark breads such as rye, cracked wheat, whole wheat, sweet rye, 100 percent whole wheat, and other breads, since these require different formulations.

■ **This efficient and sanitary dry ingredient-handing technic was hit upon by accident.**

About four years ago, we looked into the possibility of producing a better white bread by running all but our flour ingredients through an homogenizer.

And so we acquired a small 70-gal.-per-hour homogenizer from Manton Gaulin Mfg. Co., then proceeded to carry out experiments over a six-month period.

But the outcome was not encouraging. The homogenized ingredients did not improve the quality of our bread. *However, it did occur to us that this system was ideal for handling our dry ingredients. And we acted on that thought.*

Putting Idea Into Action

In the preparation of our dry ingredient emulsion, the first step is melting and metering the shortening into the premixing tanks. Drums holding 400 lb. of shortening are raised by electric hoist and pushed along a monorail to a 3,000-lb. capacity stainless steel melting tank. Here, each drum is lowered onto a stainless steel dump stand, equipped with steam coils. As the shortening liquefies, it slides into the melting tank. Steam coils at the bottom of the tank heat the shortening to a temperature of 110 deg. F.

Next, 23 gal. of melted shortening is metered into a 200-gal. stainless premix tank. The remaining shortening is recirculated through 1-in. stainless pipes (electrically heated with thermal wires) to the meter, and then back to the melting tank.

Before the other ingredients are added, the circulating system is started. A centrifugal pump moves the melted

Portion of the 4,500 sq. ft. of KRAFTILE walls at Wine Growers Guild Winery, Lodi, California • • • Cahill Bros., San Francisco, Contractors

KRAFTILE Industrial Walls

MAKE MONEY BY SAVING MONEY!

FIRST COST IS THE LAST COST ...for walls of KRAFTILE Glazed Structural Wall Units. They never need painting. They're practically scuff and scar-proof. Dirt or grease wipes off with the swipe of a cloth ...yet they can be scrubbed daily with washing compounds or disinfectants without dulling their original beauty.

ATTRACTIVE, EASILY-CLEANED KRAFTILE walls pay *extra* dividends in heightened employee morale, prestige-building impressions on plant visitors. You will be dollars ahead to investigate KRAFTILE Glazed Structural Wall Units before you build or remodel. The facts are yours for the asking; just send the coupon now.

KRAFTILE wall specialists will help you plan or figure quantities for any wall construction.

THIS IS A GLAZED STRUCTURAL WALL UNIT—a structural clay tile with a fired-on glazed surface on one or both sides. Available in clear glaze or in attractive colors... a "pre-finished" wall material with these important advantages:

★ **ONE-CRAFT INSTALLATION**—when the mason lays it up, the wall's *finished*—no lathing, plastering, painting!

★ **LIFETIME ATTRACTIVENESS**—never needs painting, can't fade, highly resistant to scratching and scarring. Pencil, crayon, lipstick, grease marks wipe off easily. Unaffected by water, steam, most acids, alkalis.

★ **DESIGNED FOR SIMPLE ERECTION**—wide range of shapes in modular dimensions permits fast installation with minimum of cutting and fitting on the job.

★ **PERMITS STEEL-SAVING REINFORCED MASONRY CONSTRUCTION**—approved installation methods and reinforced masonry will meet earthquake code requirements, use less steel than reinforced concrete!

KRAFTILE CO., Niles, California

( ) ***Send my copy of your "Graphic Standards for Glazed Tile"***
( ) ***Have your representative call***

Name_____

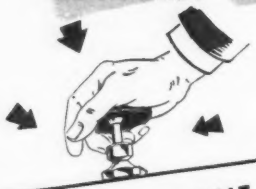
Company_____

Address_____

City_____ State_____ FE

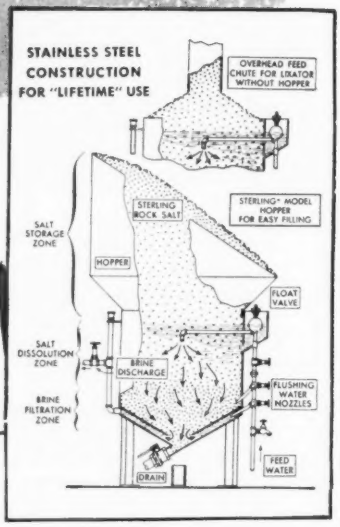
BRINE! EXACTLY RIGHT WITHOUT MEASURING or STIRRING

JUST TURN IT ON!



STERLING ROCK SALT
BRINE DELIVERED BY PIPE TO EVERY POINT IN YOUR PLANT

• FLAVORING • WASHING • SOAKING
• BLANCHING • GRADING • BRINE PEELING
• ZEOLITE WATER SOFTENERS • PICKLING



HOW LIXATOR* WORKS

In the dissolution zone—flowing through a bed of Sterling Rock Salt which is continuously replenished by gravity feed, water dissolves salt to form 100% saturated brine. **In the filtration zone**—through use of the **self-filtration** principle **originated by International,** the saturated brine is thoroughly filtered through a bed of undissolved rock salt. The rock salt itself filters the brine. Nothing else is needed.

WHAT THE LIXATOR PROVIDES

- ✓ **Chemical and bacterial purity to meet the most exacting standards for brine.**
- ✓ **Unvarying salt content of 2.65 pounds per gallon of brine.**
- ✓ **Crystal-clear brine.**
- ✓ **Continuous supply of brine.**
- ✓ **Automatic salt and water feed to Lixator.**
- ✓ **Inexpensive, rapid distribution of brine to points of use by pump and piping.**

Savings up to 20% and often more in the cost and handling of salt have been reported by many Lixate users. Why not investigate?

• Say good-by to "guesswork" and bother! You can eliminate shoveling, hauling, and laborious hand stirring of salt and water—with International's Lixate Process for Making Brine. Assures accurate salt measurement every time. Stops waste through spilling. Saves time and labor.

• The Lixator *automatically* produces 100% saturated, free-flowing, crystal-clear brine which may be piped to as many points in your plant as you wish—any distance away—by gravity or pump. YOU SIMPLY TURN A VALVE to get self-filtered LIXATE Brine that meets the most exacting chemical and bacterial standards.

An INTERNATIONAL Exclusive

The LIXATE* Process

FOR MAKING BRINE

*REG. U. S. PAT. OFF.

INTERNATIONAL SALT COMPANY, INC., Scranton, Pa.

fat through 2-in. stainless pipes back to the pre-mix tank.

While the shortening is being recirculated, 70 gal. of 90 deg. F. water is also metered in the tank. Following this comes the salt, sugar, and sweetened condensed milk.

By Bag and Barrel

Salt is dumped from a 100-lb. bag into a stainless cone-shaped hopper. A valve below the hopper is opened and the salt is sucked into the recirculating system containing the fat-water emulsion. Next, the ingredient man opens a 100-lb. bag and feeds the sugar into the hopper.

Last material added is the condensed milk. With the aid of the electric hoist, a 640-lb. barrel of the milk is dumped into the pre-mix tank.

If desired, dried skim milk can also be introduced into the feed hopper. However, more dry sugar must be added to make up for the difference when skim milk replaces a portion of the sweetened condensed.

We also have facilities for receiving tank-truck deliveries of liquid sugar and liquid milk. These can be pumped from trucks into two 1,500-gal. stainless tanks in the bakery and then metered directly into the pre-mix tanks.

Emulsifying Mix

Recirculating of all the ingredients in the pre-mix tank is continued for 2 min. Then, by adjusting a 3-way valve, part of the mix goes through a two-stage Manton Gaulin homogenizer at the rate of 1,000 gal. per hour. The remaining mix is recirculated. Pressures in the homogenizer are set for 500 lb. in the first stage, 700 lb. in the second.

For the formula we use, these pressures enable us to keep the ingredients in emulsion more than 36 hr. and to make the emulsion fluid enough for metering into the dough mixers.

Homogenizing is carried out continuously. While the ingredients are fed from one pre-mix tank to the homogenizer, the ingredient man charges the second tank.

Hold Daily-Run Load

From the homogenizer, the emulsion goes into two 1,500-gal. stainless tanks, each equipped with a propeller-type agitator. Both tanks hold enough mix for maximum daily production.

Finally, the mix is pumped through 2-in. pipes to a Bowser meter that delivers 30 gal. into a dough mixer. The emulsion is added to fermented sponge, to which water and flour have already been sealed. Capacity of each of the two dough mixers is 1,500 lb.

End (*Resume reading on page* 68)

J&L STEEL
SUN MON TUES WED THURS FRI SAT
1 2 3 4 5 6
7 8 9 10 11 12 13
14 15 16 17 18 19 20
21 22 23 24 25 26 27
28 29 30
SET A Scrap Day IN YOUR ORGANIZATION!

Set a definite day . . . soon . . . to start rounding up all the dormant scrap in your operation. Extra scrap is urgently needed to keep mills at expanded steel production.

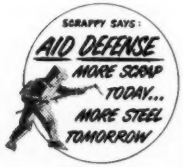
Here's what's wanted

Steel producers must have scrap over and above the "working scrap" that you normally sell. Broken or obsolete machinery and equipment . . . odds and ends . . . worn out parts—in fact, *all* the iron or steel material that's rusting away in your plant or operation. Get it out of the way . . . get it on its way into production.

Here's what to do

Set a definite day to start . . . make scrap collection the definite responsibility of one man or one group. Call your scrap dealer. He'll take all the scrap you can collect and pay you well for it.

Set YOUR Scrap Day NOW!



JONES & LAUGHLIN STEEL CORPORATION
PITTSBURGH 30, PA.

Uncooked Food for Thought

New, untrained, or day-dreaming personnel can cost you customers and money — by letting uncooked food slip by.

You can guard your quality and reputation with ATI Cook-Chex. These quality control tags attach to retort baskets right through your processing. They tell by an infallible color change when each batch is properly cooked, or which batch, if any, has been overlooked.

Certainty is assured every time, no matter what your cooking time or temperature. Simple to use. Savings in spoilage far outweigh the tiny cost. Send for samples *now*.

ASEPTIC-THERMO INDICATOR COMPANY

THE COLOR-CHANGING QUALITY CONTROL TAG

USED BY THE WORLD'S LEADING FOOD PROCESSORS

Write for Free supply of samples for trying in your own retorts

Quality Control Division, Dept. FI-10
5000 W. Jefferson Blvd., Los Angeles 16, Calif.

Send samples of ATI Cook-Chex and valuable quality control data.

My Name .....
Title .....
Company .....
Address .....
City ..... State .....

Questions & Answers

THIS MONTH'S PROBLEM

Question—In the determination of the square feet of heating surface necessary in a modern, high-vacuum, falling-film type evaporator, what heat-transfer rates can be figured on to concentrate fruit juices in the manufacture of frozen juice concentrates?

Answer to August Problem

The Question Was—A considerable number of complaints are coming to us in respect to the sifting out of our dessert powder from packages. Our product is filled in bags, which are packed in small cartons. Can you suggest where our trouble might lie?

Answer—Sifting of free-flowing dessert powders from cartons is especially to be avoided because it results in a variation in net weight of the contents at point of sale.

Most likely the folds of the top of your inner liner bags were not adequately sealed. As a result, sifting out of the contents occurred during handling and shipping of package.

This can be prevented and the net weight of the product kept uniform by carefully sealing the tops of the bags before folding and pasting the carton flaps.

Macaroons That Stay Fresh

Question—Our problem is making coconut macaroons that will not harden too quickly. Can you furnish us with a commerical formula and detailed instructions on the manufacture of macaroons that will remain soft and fresh for three months

Answer—Very likely you are (1) not toasting your macaroons properly so that they will retain their moisture, and (2) not putting them up in suitable protective packages.

Here are details on the making and packing top-quality coconut macaroons:

Mix and boil the following over brisk flame to 240 deg. F.: Granulated sugar, 14 lb.; glucose, 10 lb.; and water, 5 lb.

Place this hot sugar syrup in a mixing bowl and blend it with unsweetened macaroon coconut, 25 lb., and corn starch, 1¼ lb.

Add slowly, while mixing, egg whites, 5 lb.; baking powder, ¼ lb.; vanilla flavor, 1 oz.; and sweetened condensed milk, 5 lb.

On slightly greased pans deposit batter, using a cookie machine or cake depositor with ½-in. dia. openings.

Bake macaroons in hot oven with a good top heat—about 425 deg. F. Care must be taken here to prevent too much bottom heat, since the sweetened condensed milk tends to brown the macaroons quickly. Macaroons weighing about ½ oz. will bake to a golden brown color in 7-8 min.

Immediately cool the macaroons and wrap them in moisture-proof transparent bags. Macaroons will not retain their moisture if exposed to the air too long before packaging.

Why Oxygen "Creeps Up"

Question—We have started to vacuum-package a spray dried powdered non-fat milk, and oxygen tests on cans shortly after sealing show a content well below 2.5 percent. However, when we recheck a batch ten days later we find that oxygen percentage has risen to well over an undesirable 3.0 percent. What causes this, and how can it be prevented?

Answer—Air bubbles are trapped in milk products when they are spray dried into powder form. This entrapped air will not burst from the powder during normal evacuation in filling. After sealing, however, as the can stands, oxygen will slowly diffuse from these tiny air bubbles to equalize the concentration of this gas around the powder. Thus, when an Orsat determination is made on the can several days after sealing, this diffusion of occluded oxygen will have raised its percentage considerably above that recorded just after sealing.

One method of preventing this oxygen build-up is to hold the spray

How Would *You* Do It?

Readers are invited to submit to FOOD ENGINEERING answers to questions in this department, especially to "This Month's Problem." Selected answers will be published, with credit (unless you specify otherwise). We pay space rates.

What Is *Your* Problem?

Subscribers also are invited to send in food engineering questions. We undertake to provide answers, free, to the best of our ability. We do not undertake costly investigations. Give full information and your name. Your identity will not be disclosed.

Write to Questions & Answers Editor, FOOD ENGINEERING, 330 W. 42nd St., New York 18, N. Y.

Squeezing Extra Profit

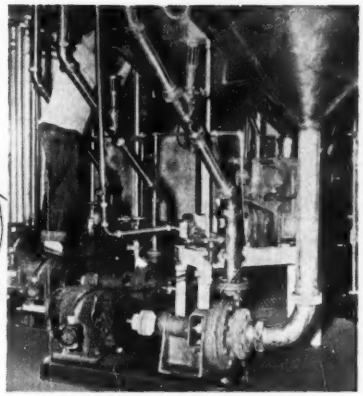
out of the orange concentrate business

It's a remarkable product—this orange concentrate . . . a boon to housewives, a welcome relief to household budgets, and a vast market for the enterprising producers.

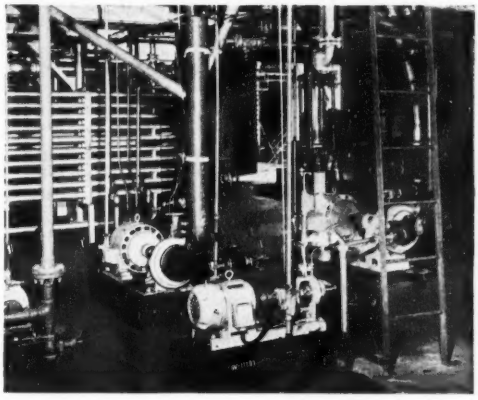
As might be expected, these producers have selected the most advanced equipment in order to produce at lowest costs—maximum profit. Included are Worthington Worthite Centrifugal Pumps with mechanical seals. Many installations in Florida and California are now in their third season, continually providing worthwhile savings through:

- Exceptional resistance to corrosion—no repairs or shutdown.
- Maintained high vacuum—no air in-leakage.
- Easy cleaning, without opening for steaming—by circulating the cleaning chemical through the evaporators.
- Low power consumption for circulating the heavy viscous concentrate.
- Quiet operation without cavitation with unusually low required NPSH.

First cost is low, too. Investigate Worthington Worthite Pumps for *any* acid or alkali applications—weak or strong. Worthington Worthite Pumps are built in standard sizes, from 1 to 20,000 gpm. For further proof that *there's more worth in Worthington*, call our nearest District Office or write to Worthington Pump and Machinery Corporation, Centrifugal Pump Division, Harrison, New Jersey.



FLORIDA CITRUS CANNERS COOPERATIVE (Lake Wales, Fla.) uses Worthington Worthite Pumps (mechanical-seal type) to circulate concentrate in a Mojonnier Bros. evaporator, 29.5" to 29.7" Hg vacuum, where fresh, depulped orange juice is concentrated at low temperature to ⅛ its original water volume. These pumps are now in their third season without repair.



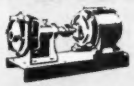
MINUTE MAID CORP. (Plymouth, Fla.) installation uses Worthington Worthite Pumps (mechanical-seal type) on this Buflovak Evaporator. Large pumps in rear circulate the orange juice, small pump discharges concentrate through Rotameter from 29.5" Hg vacuum to holding tank under atmospheric pressure.

WORTHINGTON

C.1.3

THE WORLD'S BROADEST LINE ASSURES YOU THE RIGHT PUMP FOR EVERY JOB

Types C G and C G L. Sizes ¾" to 10". Capacities to 5000 GPM; heads to 200 ft. Liquid ends of WORTHITE alloy.



Type C F. Sizes 1" to 4". Capacities to 1000 GPM; heads to 130 ft. Standard, all iron and all bronze.

Type C Q. Sizes 1½" to 3". Capacities to 600 GPM; heads to 130 ft. at 1750 RPM. Closed impeller. WORTHITE shaft and fittings.

Type L. Sizes 3" to 8". Capacities to 2250 GPM; heads to 300 ft. Single stage volute. For general service.

HELP Yourself NOW..

to lower material-handling costs
. . . lower production costs
with . . .

POWERED INDUSTRIAL TRUCKS

These are days of high operating costs, limited manpower, material-handling headaches, and stepped-up production demands . . . days that test your ability and know-how.

One way to overcome seemingly "hopeless" production tasks is to overhaul your plant's material-handling system NOW.

Powered industrial trucks can do wonders for your production schedules, make best use of your available manpower, and help you cut costs at the same time.

CHECK THESE TIME AND COST SAVERS:

DEPENDABILITY	powered industrial trucks are sturdily constructed for rigorous, heavy-duty work, and years of active service.
SPEED	quick-starting, easy to handle, maneuverable trucks will speed the flow of materials anywhere in your plant.
ADAPTABILITY	powered industrial trucks are designed for use in every industry . . . for stacking, lifting, unloading and transporting all types of goods.
ECONOMY	trucks handle materials in a fraction of the time formerly required, saving valuable man hours; men replaced can move into essential production.
SAFETY	industrial trucks make work easier for employees . . . eliminate many injury hazards . . . cut down product damage.

Powered industrial trucks can help bring new economy and efficiency of operation to your business NOW. Ask your industrial truck sales engineer to show you cost figures and case histories for *your* industry.

THE INDUSTRIAL TRUCK ASSOCIATION
1701 NORTH BROAD STREET • PHILADELPHIA 40, PA.

dried product in vacuumized drums for several days prior to canning—thereby bringing the occluded oxygen "out into the open" for removal by normal vacuum filling. Another way would be to run a second vacuumizing of the cans 7-10 days after filling.

Curbing Discoloration of Fruit

Question—How much ascorbic acid must be used to control browning of frozen sliced peaches and apricots?

Answer—For peaches, use 150 to 200 mg. of ascorbic acid per pound. And for apricots a minimum of 200 mg. of ascorbic acid should be employed for each pound.

But merely adding the required amounts of ascorbic acid is not enough. Careful and thorough blending of the acid with the fruits is essential.

In putting up syrup packs, dissolve the acid in a small portion of the water used to make up the syrup. Then add the mix to the remaining syrup and blend thoroughly before pumping the treated syrup to the filling machine.

For dry sugar packs, mix the ascorbic acid with granulated sugar. Slices of the fruit are then coated by feeding them onto a shaker. There should be mounted over the shaker a V-shaped bottom hopper for delivering a regulated flow of the sugar-ascorbic acid mix to the fruit.

To stabilize the ascorbic acid and thereby improve the pack, you might consider using a citric acid-ascorbic acid mix. If you do, add twice as much citric as ascorbic acid.

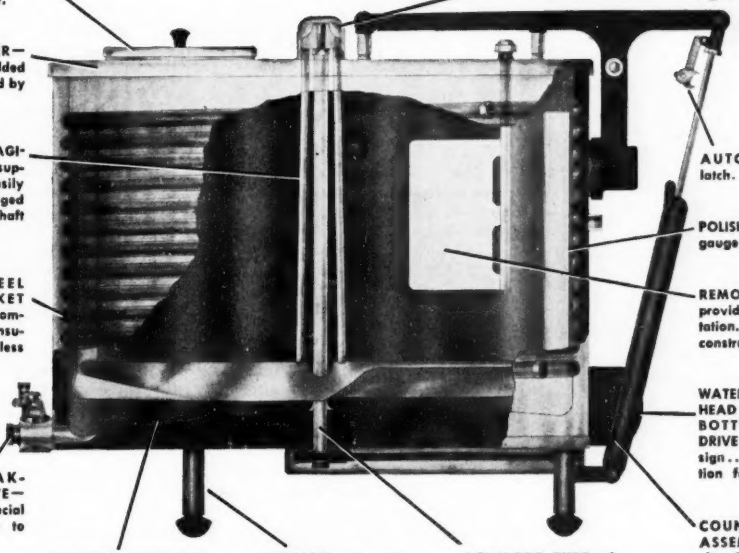
To Make Spaghetti Sauce

Question—Have you a formula and processing details for making sauce for canned spaghetti?

Answer—Here's a good general formula to work with: Tomato pulp (sp. gr., 1.045), 4¾ gal.; paprika, 1 lb.; fresh onions, 3¾ lb.; fresh garlic, ½ oz.; white pepper, 1 oz.; vegetable extract, 5 oz.; salt, 3½ lb.; granulated sugar, 7½ lb.; grated Romano cheese, 1 lb.; grated American cheese, 5¼ lb.; and water, about 17 gal.

Now to preparing the sauce: Add the tomato pulp to a 50-gal., steam-jacketed kettle and run in the water. Next, introduce the sugar and other ingredients. Spices should be put in a sugar bag and hung in the kettle. If onion or garlic powder is used in place of the fresh products, use a little water to make a paste and then add the paste along with the other ingredients. Finally, bring the contents of the kettle to a rolling boil, shut off the heat, and feed the sauce to a finisher and then the filler.

You'll want all these advanced Pfaudler features in your next pressure process vats . . .



INSPECTION OPENING with 5-in. "Lift-Off" stainless steel cover.

INSULATED COVER—One-piece, all welded stainless steel. Lifted by counterbalance.

AIRPLANE TYPE AGITATOR with truss supports. Can be easily lifted and disengaged from the drive shaft with one hand.

STAINLESS STEEL PRESSURE JACKET surrounded by 2-in. compressed fiberglass insulation, polished stainless steel sheathing.

PFAUDLER LEAK-DETECTOR VALVE—Plug type with special hold-down clamp to prevent leakage.

AGITATOR COVER CAP—Agitator bearing surface is above liquid level. This eliminates need for agitator opening in vat liner.

AUTOMATIC cover latch.

POLISHED LINER of 14-gauge stainless steel.

REMOVABLE BAFFLE provides improved agitation. Stainless steel construction.

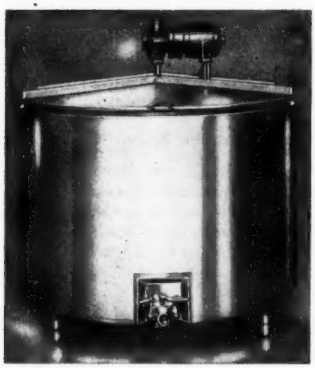
WATERPROOF GEAR-HEAD MOTOR AND BOTTOM "V"-BELT DRIVE—Simplified design . . . sturdy construction for long service.

COUNTERBALANCE ASSEMBLY with enclosed spring for effortless opening and closing of cover.

CONVEX BOTTOM HEAD—Gives extra strength and just the right pitch for complete drainage.

SANITARY adjustable leg supports.

AGITATOR TUBE of welded stainless steel extends above liquid level—no need for packing or rotary seals.



LARGE PFAUDLER pressure process vat with agitator drive at top.

For processing such products as syrups and margerine, Pfaudler Pressure "Lo-Vats" deliver the efficient heating, holding, cooling and mixing that help to keep your operating costs at a minimum. Highly versatile, these "Lo-Vats" can be readily adapted to different processes. To help speed changeovers, they are self-draining and simple in design for easy cleaning.

Jackets are built to withstand 150 lb. pressure—no danger of damage through operating error. A multiple jet manifold provides rapid heating with steam or hot water. For cooling, chilled water, ammonia or Freon can be used.

It will pay you to consider all these important Pfaudler features before you buy your next pressure vats. Made in 100, 200, and 300 gallon capacities. Also, larger Pfaudler Pressure vat with agitator installed at top is available in 500, 800 and 1000 gallon capacities.

Pfaudler

THE PFAUDLER CO., ROCHESTER 3, NEW YORK
Engineers and Fabricators of Food Processing Equipment

Gravity Fillers · Deaerators
Piston Fillers · Vacuum Pans
Steam Peelers · Evaporators

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Please send me full details on:

☐ Pfaudler Pressure "Lo-Vats"; 100, 200 and 300 gal.

☐ Pfaudler Pressure Process Vats; 500, 800 and 1000 gal.

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A NEW and better way to fill powders

Controlled Vacuum
FILLING
MACHINES

Designed for filling containers with powders, using, for the first time, a controlled vacuum principle.

Permits a flow of material only when a predetermined vacuum is reached in container.

Because of positive control valve, we do not depend on bridging of material; consequently, extremely large nozzle openings are possible, thereby giving tremendous filling speeds.

Because flow of air is always in one direction, (toward source of vacuum) it is unnecessary to clean the vacuum line at any time for fear of contamination of one product with the carryover or odors from the previous filling.

A self-contained unit requiring no exterior water, air or vacuum lines. Electrical consumption very low.

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Designers. Consultants. Equipment

Useful New Books & Government Publications

Approved Methods of Vitamin Analysis Brought Up-to-Date in New Manual

METHODS OF VITAMIN ASSAY, *2d edition. Prepared and edited by the Assn. of Vitamin Chemists, Inc. Published by Interscience Publishers, Inc., 250 Fifth Ave., New York* 1, *N. Y. 301 pages, 6¼ x 9¼ in., cloth. Price,* $5.50.

This edition reflects a number of new vitamin assay procedures in addition to further assimilation of both new and old data involving the methods presented previously.

Now included are assays for pantothenic acid, pyridoxine, folic acid, biotin, vitamin B_{12} (microbiological), and a chemical analysis for niacin.

Also the chapter "Methods for Other Vitamins," which discusses those vitamins for which specific procedures have not been outlined, has been extended. Here the analyst has been provided with bases for selecting the most promising of the methods that have not yet been critically evaluated by members of the Association.

The first chapter, "Sampling for Vitamin Analyses," goes into several general aspects of vitamin determinations. These include sampling methods; statistical control of sampling and results; and the application of the discussed sampling technics to various products, such as meat, cereals and mixed feeds, fruits and vegetables, and pharmaceuticals.

Thereafter, a separate chapter is devoted to each of the 13 vitamin assays surveyed. Even though the book has been specifically prepared for the analytical chemist, it can be used as a general reference. The history, physical and chemical properties, and summary of known methods of analysis of each vitamin precede the details of the approved assay procedures.

The volume attempts to detail all possible factors that may influence the results of any of the tests described, thus providing a vehicle for standardization between laboratories and technicians. Some of these factors include storage, extraction, pH adjustment, mechanical manipulations, reagents used, sequence of timing, and ambient laboratory conditions in the vitamin assays.

Complete equipment lists are included with each analysis as well as intensive references. When followed by any competent laboratory technician, the carefully prepared assays should yield representative and reproducible results.

Piping Volume Fits Need

INDUSTRIAL PIPING. *By Charles T. Littleton and R. A. Dickson. Published by McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York* 18, *N. Y.,* 1951. 394 *pages; 6¼ x 9¼ in., cloth. Price* $8.

Basically consolidating the practical data available on industrial piping, this book eliminates much of the necessity for cross-references through data and spec sheets, catalogs, and handbooks.

Thus the design engineer, draftsman, erection foreman, and student involved in the layout and installation of piping systems may be spared a heretofore arduous task.

Included are chapters on what kind of pipe, valves, and fittings should be used where; the procedures to be used in laying out flowsheets, plot plans, and erection drawings; and simplified calculation methods for line sizing and insulation requirements.

Of particular interest to the food engineer is the material on alloy piping and cost estimating. Almost 100 pages are devoted to the latter subject in a very complete presentation.

Food and the Body

FUNDAMENTALS OF NUTRITION. *By Bernard E. Silver. Published by Delmar Publishers, Inc., Albany, N. Y., under the auspices of the University of the State of New York,* 1951. 232 *pages; 8 x 10¼ in., plastic bound. Price,* $2.65.

Primarily written as a manual to aid in developing materials and methods of instructions, this book can be used to advantage by anyone in the fields of nutrition or medicine.

Studies on food enrichment, the addition of fluorine to drinking water, effects of cooking methods on nutritive value of foods, and relationship between nutrition and disease are all discussed in a practical, non-technical manner.

A complete 55-page table covering the "Composition of Foods" appears in the appendix. The energy, vitamins,

and mineral content of the foods are listed.

Biochemistry Yearly

ANNUAL REVIEW OF BIOCHEMISTRY, VOL. 20. *Edited by J. Murray Luck, H. S. Loring, and Gordon Mackinney. Published by Annual Reviews, Inc., Stanford, Calif.*, 1951. 648 pages; 6¼ *x* 9¼ *in.; cloth. Price* $6.

There is more and more of a turn to biochemistry for clues in the investigation of metabolism. Since foods are the primary sources of growth factors in humans, this volume can be used as a technical reference.

Background information is presented on carbohydrates, lipids, proteins, nucleic acids, steroids, fat and water-soluble vitamins, and many other related subjects. Included are 80 pages of references.

Government Publications

COOKING QUALITY, SPECIFIC GRAVITY, AND REDUCING-SUGAR CONTENT OF EARLY-CROP POTATOES. *By Mary E. Kirkpatrick et al. U. S. Department of Agriculture, Circular No.* 872. *Price* 10c. This constitutes a study of the palatability of early potatoes by determining their suitability for boiling, mashing, baking, French frying, and use in salads.

These recently issued documents are available, at the prices indicated, from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. When no price is indicated, the pamphlet is free and should be ordered directly from the Bureau responsible for its issue.

IS YOUR PLANT A TARGET? *National Security Resources Board, August* 1951. *Price* 25c. Recommendations presented in this pamphlet are based upon experience gained from an actual industrial-dispersion pilot operation conducted in Seattle.

LIST OF MANUFACTURERS OF PACKAGES, PACKAGING MATERIALS, AND EQUIPMENT FOR PREPACKAGING FRESH FRUITS AND VEGETABLES, MAY 1951. *Production & Marketing Administration, U. S. Department of Agriculture, unnumbered document.*

SUGAR, DEXTROSE, AND CORN SYRUP DELIVERIES (BY QUARTERS). *U. S. Department of Agriculture, Sugar Reports No.* 12. A summarization of the experience of more than 700 food processors with respect to sweeteners in most sweetener-containing products.

Yes ...WE FABRICATE TO U-68, 69 AND 70, A.S.M.E. CODE REQUIREMENTS

X-Ray inspection at DOWNINGTOWN

To fabricate welded and riveted products up to 1¼" in thickness, the facilities of DOWNINGTON IRON WORKS include: X-Ray and Magnaflux Equipment, Welding Equipment (manual, heliarc and automatic), a Universal Testing Machine (120,000# capacity) and such other equipment as necessary in the fabrication of A.S.M.E. or A.P.I.—A.S.M.E. Code vessels.

More than 97,000 sq. ft. of space—79,000 under roof and 18,300 in the yard—available for fabrication work. Our personnel—skilled workmen, engineers, technicians and research men—is constantly striving to improve the quality of our products and the efficiency of our production.

DOWNINGTON has many years' experience in fabrication of Carbon Steel, Stainless Steel, Stainless Clad, Nickel Clad . . . and many of the Non-Ferrous Metals. Send for Bulletin entitled: "Partial Analysis of 1950 A.S.M.E. Code" . . . useful as a handy reference guide . . . and explains our facilities.

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DOWNINGTOWN, PA.
STEEL • ALLOY PLATE FABRICATION
HEAT EXCHANGERS

NEW YORK OFFICE • 30 CHURCH STREET

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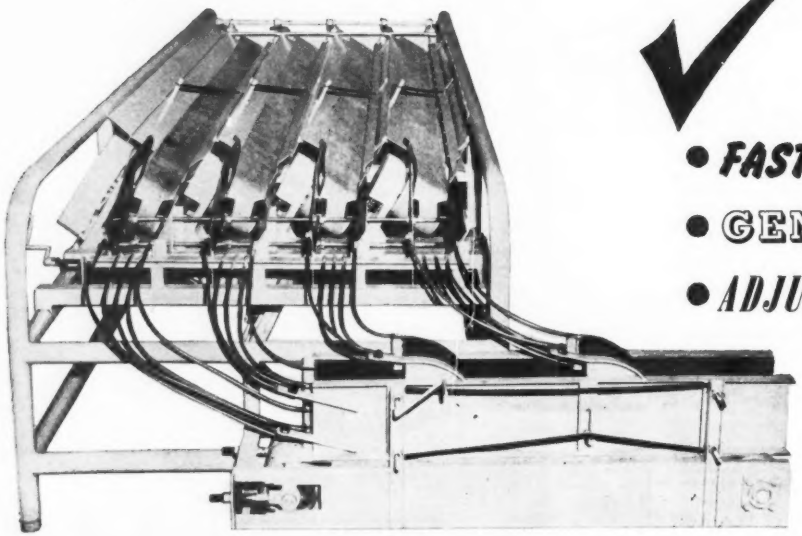


- FAST
- GENTLE
- ADJUSTABLE

DUDLEY 400 CAN UNSCRAMBLER

The Dudley Can Unscrambler provides maximum can speed from dump to labeler while insuring gentle handling of the most temperamental pack.

Processors may now run asparagus, figs, pears, and whole tomatoes in addition to less fragile foods at speeds well over 600 cans per minute without damage to cans or contents.

The Dudley Unscrambler is quickly adjustable in a matter of minutes by a simple side lever to accommodate any conventional can size including 208x208, 407x406, etc.

Write for bulletin 10 containing further information on the Dudley Unscramblers; four lane, two lane, and for tolls, ovals, plate, and oblongs.

DUDLEY MACHINERY CORPORATION

P. O. BOX 397, MOUNTAIN VIEW, CALIFORNIA

KEEPING UP WITH THE FIELD

Technical News • Washington Highlights • Economic Trends • Labor Developments

Use Your Tax $$$

Want to get some low-cost research and stimulate business to boot—all from your tax dollars?

Government officials recently pointed out that U. S. corporations are not taking full advantage of a perfectly legal and intentional "loophole" in the tax laws. Deductions up to 5 percent from earnings before taxes are allowable—provided the money in question is used for educational, scientific, or welfare purposes.

At the top excess profits rate of 77 percent, corporations would actually pay only $23 per $100 outlay in such activities.

Seek Yearly Wage Floor

The CIO has revived its demand for a guaranteed annual wage in the meat packing field. While not putting full pressure behind its campaign at the present—due to full employment and rising living costs—the union is looking ahead. It is expected that other branches of the food industries may be involved shortly.

Many packinghouse workers already are assured a minimum number of pay hours per week. But an annual guarantee has been nailed down only at George A. Hormel & Co.'s Austin, Minn., plant.

The CIO program calls for a minimum of $3,000 per year for laborers, with graduated increases for more skilled workers. The guarantee would cover only straight-time pay.

Streamlined Coast Plant

A number of well-engineered innovations have been prominent in the streamlining of operations at Hunt Foods, Inc., growing West Coast packer.

Included is convenient manufacture of cans and glass containers in a facility adjacent to the cannery, standardization of can sizes to a minimum number, a new patented cooking process, and liberal use of conveyors and pipe lines. Today, the company's tomato products are even pumped between plants.

The United Can & Glass Co. is cooperating with Hunt in supplying the containers from "right next-door," thus materially cutting handling and freight costs.

Paradoxically, the *new* cooking process is based on the *old*—the supposedly outdated retort method. By making use of motorized trucks and other mechanical equipment to handle the retorts, rotary and high pressure cookers have been eliminated.

Packer of tomato and peach products, the company maintains plants at Hayward and Fullerton, Calif.

Speeds Bacon Cure

Curing time for bacon bellies can now be drastically reduced by use of a new procedure, according to the Griffith Laboratories of Chicago.

After two years of research, the new technic is currently being tested commercially in several packinghouses. Even for the largest bellies, no more than 24 hr. is required—well under the time taken in standard refrigeration.

Advantages, besides the big time-cut, are said to be in an improved product and lowered unit-processing costs. Uniformity of cure, longer shelf life, lower free fatty acid content, better color retention, elimination of gray spots, and a sweeter taste are all claimed.

Essentially the method involves the following: Preconditioning with an antioxidant for 8 to 12 hr. at 38 to 40 deg. F. The solution is recirculated all during this step.

Next, the bellies are immersed in the special curing bath (made up of a fusion of sodium nitrite and nitrate, salt, and sugars) at 127 deg. F. for a time interval based on the weight of the bacon—1 hr. per pound. Salt absorption is about 1.7 percent, and there is a green-weight loss of close to 2 percent.

The cured bellies are finally combed, sprayed for 6 min. with 160 deg. F. water to remove excessive salts, then smoked.

ICC Okays Freight Hike

A new national freight rate increase has been granted by the ICC—a jump applying to both canners and fresh fruit shippers.

The authorized boosts, in the form of surcharges, will be 9 percent within the eastern territory, and 6 percent in others, including interterritorial shipments. These rates, however, are limited to a maximum of 6c. per hundredweight on each shipment of canned foods.

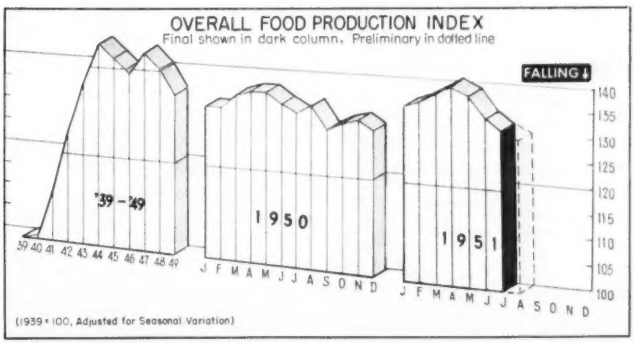
The ICC has explained, for example, that if application of the 9 percent or 6 percent surcharges adds more than 6c. per cwt. to the cost of a shipment, the increase will be limited to 6c. per cwt.

No added charges are allowed for refrigeration, heating and demurrage. The authority to maintain these increased rates expires Feb. 28, 1953.

To Make Frozen Pineapple

Hawaiian Pineapple Co.'s long-awaited venture into commercial production of frozen concentrated pineapple juice is expected to materialize before the end of the year.

Experimental runs are slated for this fall on the new low-temperature equipment being built and installed by the Howard Corp. of Los Angeles. Of particular interest is the set-up whereby pineapple juice essence will be rectified and recovered in a large-scale, high-vacuum still. It will be blended with the concentrate prior to freezing.



Plant Modernization ...Expansion... Without Production Loss

● Call on a Ferguson First Team of engineers, designers and builders . . . Men carefully selected for their training and experience in the *Food Industry* . . . Men with a thorough understanding of *processing plant layout—equipment—instrumentation—mechanization—packaging—material handling.*

Ferguson cooperative effort can effect new economies in your plant operation, improve processing efficiency, increase capacity—without shutdown or production interruption.

Preliminary Discussions in Confidence and Without Obligation.

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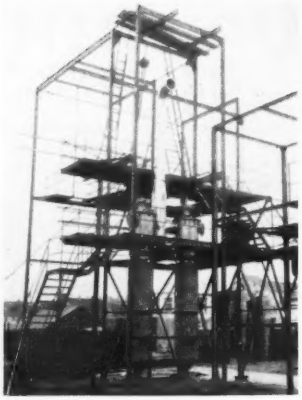
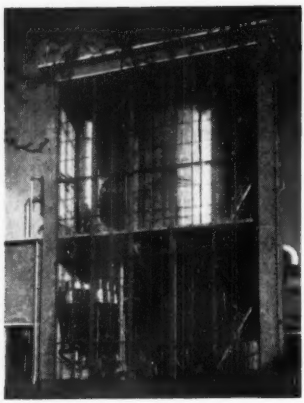
EXPERIENCE . . . THE FOURTH DIMENSION





UN Aids Milk Plants

Milk drying plants, such as shown above, are being erected in eleven countries throughout the world. Pictured left: Concentrating unit being built in conjunction with drying installation by Luwa Co., Zurich, Switzerland (U.S. rep., Rodney Hunt, Inc., Orange, Mass.). Right: Spray drying equipment of type being used in new Chilean plant designed by Niro Atomizer Corp., Copenhagen, Denmark (U.S. rep., Nichols Engineering & Research Corp., New York City). These projects are sponsored by the United Nations International Children's Emergency fund, which aims to provide low-cost dairy products for children.

Slate Fish Research

The U. S. Fish & Wildlife Service has developed the following technological program for 1952, based on industry recommendations.

Nutrition: 1. Investigation of the toughening of frozen blue-crab meat; 2. Feeding studies with gum extracted from Irish moss; 3. Chemical and physical properties of fish and shellfish proteins (relationship between protein and water); 4 Study of cause of texture change of canned salmon prepared from frozen fish; 5. Thiaminase content of certain species of fish used in feeding for animals.

Refrigeration: 1. Freezing fish at sea, defrosting, filleting, and refreezing and fillets; 2. Freezing and storing Alaska shrimp and Dungeness crabs; 3. Preparation of a manual on the refrigeration of fish; 4. Effect of the cycle of different storage conditions encountered in marketing upon the quality of frozen fish (effect of storing glazed whole fish in rooms provided with air circulation).

Processing and Preservations 1. Development of specialty food products from Alaska fish and edible fish trimmings.

Analysis and Composition: 1. Chemical composition of fish (menhaden); 2. Cooperative work with the Assn. of Official Agricultural Chemists on determination of oil in fish meal; 3 Composition and cold storage life of fresh water fish.

Byproducts: 1. Vitamin content and nutritive value of fishery by products; 2. Utilization of Viscera from round (whole) fish frozen at sea; 3. Study of pharmaceutical and other industrial products from salmon eggs.

"Operation Conversion"

Small businesses can insure against a possible squeeze in the event of full mobilization—by planning ahead to meet future defense needs.

Already a number of firms have switched to the manufacture of military products. Listed below are the items these companies used to make and the military products now manufactured:

Peacetime	Military
Containers	Fiber containers for guns
Cans	Ammunition containers
Doughnut Machines	Cluster adapters for shells
Confectionery	Ration tablets
Cube steak machines	Chain slings
General	Packs of tobacco, toilet articles, confections, and sundries

Detailed information on conversions may be obtained from the Business Information Service, U. S. Department of Commerce, Washington 25.

Yogurt Demand Up

Diet conscious citizens are largely responsible for the increased production of various fermented milks in this country, particularly yogurt.

So said C. B. Lane of Breakstone Bros., Walton, N. Y., in addressing the recent Cornell Dairy Industry Conference at Ithaca, N. Y.

Yogurt, he declared, should contain little or no free moisture, have a heavy custard-like body, a smooth surface, and a mildly acid flavor.

Breakfasts for Mexico

A complete breakfast cereal plant has just been opened by the M. W. Kellogg Co. at Queretaro, Mexico.

Erected at a cost of 1.2 million dollars, the factory is expected to produce a million and a half packages of cereal annually. Mexican raw materials and labor will be used almost entirely.

Field Facts

Notes gleaned from processors and raw material suppliers indicate that—

Cattle slaughter this past summer was just slightly less than last; however, the number of head on the range is at an all-time peak . . . *Cheese* importers will be limited to only 15 million pounds this year — five-twelfths of the 1950 quota . . . *Ice cream* production is down 5 percent from the average of the last five years . . . conventional quart-size *milk* bottles are losing favor in the the Chicago area to half-and full-gallon containers . . . *Butter* stocks are said to be ample at present, even though slightly down.

Frozen shrimp may soon be included under the voluntary sea food inspection service of the government . . . The Alaska *salmon* pack is considerably behind average so far this year . . . Use of *fish* and *fish waste* for feeds, oils, and fertilizers is climbing rapidly.

World *sugar* production for the year is estimated at 43 million tons—13 million from North America . . . *Coffee* imports are running almost half of what they were last year . . . Australian *wheat* exports are expected to decline and finally cease entirely in the near future. The Down Under farmers are finding sheep raising more profitable . . . up 8 percent is the world harvest of *stone fruits*, the total being put at 7.2 million tons.

Total cases of *canned asparagus* in the U. S. should hit the 5 million mark this season . . . The '51 pack of *frozen spring spinach* is put at 55 million pounds . . . *Canned sweet corn* production dropped to 22 million cases this past season . . . In the same period *apple sauce* almost doubled to the 13 million-case figure.

Cultivation of *lemons* in Mexico is up. Some 70,000 tons were picked last year . . . California *wine* shipments are down 19 percent so far

STEEL

Every Kind

Some steel products are in short supply but over-all stocks are still large, diversified

Plates, Structurals, Bars, Sheets, Tubes, etc. . . . Carbon, Alloy and Stainless Steels . . . .

RYERSON

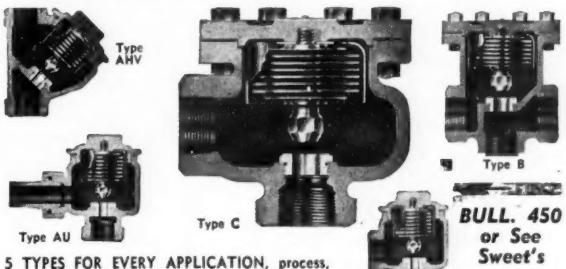
Joseph T. Ryerson & Son, Inc. Plants: New York, Boston, Philadelphia, Detroit, Cincinnati, Cleveland, Pittsburgh, Buffalo, Chicago, Milwaukee, St. Louis, Los Angeles, San Francisco

In This Plant Nicholson Traps

SAVED 10% IN STEAM COSTS

Chief Engineer H. F. D. stated, after Nicholsons replaced mechanical traps in his plant: "Saving in steam waste cut our fuel cost at least 10%. Yet application temperatures were up 30°-40°. And relief of all air binding effected faster warm-up."

Operate on lowest temperature differential; 2 to 6 times average drainage capacity; maximum air venting. For other advanced Nicholson features send for Bulletin 450.



5 TYPES FOR EVERY APPLICATION, process, heat, power. Sizes, ¼" to 2"; pressure to 225 lbs.

BULL. 450 or See Sweet's

W. H. NICHOLSON & CO., 193 Oregon St., Wilkes-Barre, Pa.

Sales and Engineering Offices in 53 Principal Cities

Glistening Protection

AGAINST PRODUCT CONTAMINATION

AN examination of Tri-Clover sanitary fittings, valves, pumps and specialties will convince you that here is your finest protection against product contamination. The close grained, flawless surface and the exclusive Hi-Gloss finish of Tri-Clover products truly exemplifies the positive protection and cleanliness that is so necessary in processing foods and beverages.

Tri-Clover has spent over 30 years in developing the most complete line to satisfy every product demand and piping problem. Careful, precision fabrication methods have developed this superior line. Leak proof . . . easy to install . . . easy to disassemble and clean . . . long life . . . completely sanitary . . . exclusive designs . . . these are the features that benefit Tri-Clover users.

Satisfy all your fitting, valve, pump, tubing and piping requirements from this one dependable source. Specify Tri-Clover throughout your plant, and assure yourself of the finest. See your nearest jobber or write us for information.

No. 7 SANITARY TEE
No. 12HR COMPLETE SANITARY UNION
No. 21 ADAPTER — MALE NPT and SANITARY THREAD
No. 60Q TWO-WAY ECCENTRIC VALVE—Designed especially for bottler's use.
No. 60Y STRAIGHT WAY COMPRESSION VALVE
No. 60T "T"-TYPE COMPRESSION VALVE
SPECIAL "SUPER SPEED" BOTTLER'S TOOL SET . . . contains all tools necessary to completely install and service 1-inch sanitary lines, in handy case.
TRI-CLOVER CENTRIFUGAL PUMPS . . . a complete line of non-clogging Sanitary and Industrial types for dairy and food processing — bottling — chemical and general industrial use.

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TRI-CLOVER

FABRICATED STAINLESS STEEL INDUSTRIAL FITTINGS AND INDUSTRIAL PUMPS

THE Complete LINE

this season . . . *orange and lemon oils* are in very short supply . . . *Peppermint* growers expect a bumper crop, while the *spearmint* yield will be below normal.

Eye U. S. Operations

Sixteen top-level representatives of the British fruit and vegetable industry are presently touring this country to compare English operations with those in the U. S.

The Anglo-American Council on Productivity and the E.C.A. are jointly sponsoring this visit of the productivity team.

The project manager, Mr. John E. Bach, may be reached at 2 Park Ave., N. Y. C., until Oct. 23.

Test Pre-Pack Produce

Individual transparent consumer packages of fruits and vegetables, when sold next to the same items in bulk form, come out second best, according to a recent survey.

The study involved a series of controlled experiments in the Northeast, sponsored by the Cornell University Agricultural Experiment Station.

For all items covered, packages comprised about one-third of the total volume of sales, when priced the same as the bulk products. However, certain wrapped items were received more readily than others. Pre-packed spinach, for example, outsold the bulk product.

Pre-packed wax beans, beet greens, broccoli, and Pascal celery made up about 45 percent of the total sales. But carrots, cauliflower, lettuce, radishes, and grapes showed up poorly—with only a 25 percent rating.

A general decline was experienced in the sales of almost all wrapped items when premiums of 2, 4, and 6c were charged for them.

The loss rate of fruits and vegetables handled in consumer packages was somewhat higher than for the same items in bulk form. Losses of packaged vegetables averaged 18.5 percent of the total volume handled, as compared with losses of 8.2 percent for the same articles in bulk. Losses were due mainly to spoilage of the product within the package and breakage of the films.

Form Apple Group

Processed Apples Institute, Inc., has been organized by leading eastern manufacturers of apple products to promote uses and consumption of processed apple products.

"Consumer interest in quality apple products," says H. E. Meinhold, president of the new group, "has not kept

Feather for Your Cap

Christmas comes in October for America's health, recreation and welfare services. This is the month that United Red Feather Campaigns raise funds for the Community Chests. And this time a United Defense Fund is included for the armed forces and for civilians who are victims of defense operations.

Last fall, this many-in-one effort raised an estimated $200 million. With defense requirements added, much more is needed this time.

Leading businessmen have endorsed the Red Feather coordinated campaign as a highly worthwhile, efficient and convenient method of obtaining money to support important beneficent activities. In fact, this nationwide appeal is under the direction of H. J. Heinz II, president of the well-known Pittsburgh food company.

So those in industry who contribute not only will be helping a great cause —a great number of great causes, in fact—but they will be demonstrating that people in business have a warm heart and a genuine concern about the welfare of individuals.

When you support the Red Feather, you give to Community Chests of America and to United Defense Fund. Such support is a feather in anyone's cap.

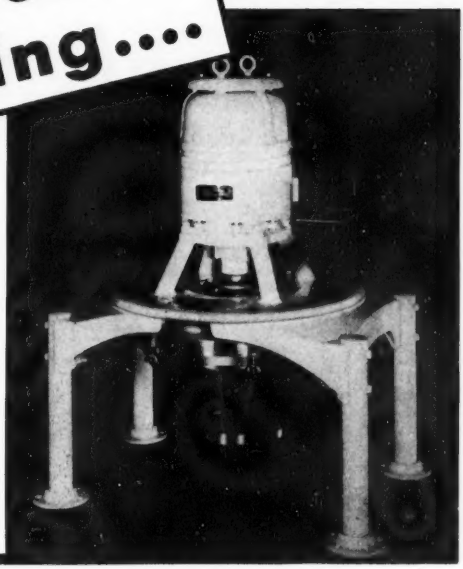
—The Editors

---

up with the technological advancement in the apple processing industry. In the Institute we plan to promote this interest, thereby increasing consumer use. This is a timely program in view of the ample supplies of quality apples today and the prospect of a large pack from this season's heavy crop."

The Institute's long range program will encompass sales promotion, market research, nutrition studies, and all elements of industry promotion and public relations.

Improved Mixing....



Self-Rising Flour
Prepared Cake Mixes
Enriched Flour
Ice Cream Mixes
Flavorings
Chemicals
Drugs

with **"ENTOLETER"** *High Speed MIXER*

HOMOGENEOUS MIXING is now obtainable for food products in faster time . . . at less cost . . . with the "ENTOLETER" Mixer. The "ENTOLETER" Mixer is a new-type centrifugal machine designed to provide thorough mixing and blending . . . in faster time . . . at reduced cost. The saving in mixing time is usually accompanied by a smoother, more intimate mix, permitting improvement in product quality. The high-speed centrifugal action thoroughly disperses materials, producing a remarkably smooth textured product. The Mixer is adaptable to continuous or batch processes.

The "ENTOLETER" Mixer requires only 12 cu. ft., with capacity of 12,000 lbs. of finished mix per hour. . . . where beetle or similar insect infestation may be present, this equipment destroys all stages of insect life. Mail coupon today.

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The Safety Car Heating & Lighting Co., Inc.
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Please send bulletin describing the "ENTOLETER" High-Speed Mixer

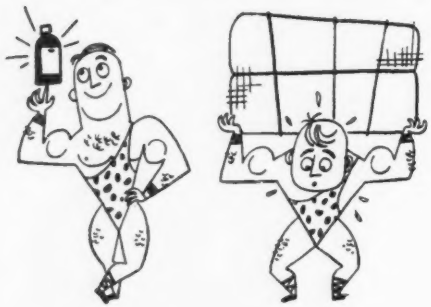
Name .....
Company .....
Address .....
City, Zone and State .....

Foreign Distributors: Henry Simon Ltd., Stockport, England

give your products

a new **"taste-lift"** with

SPISORESINS*



● Samson made an unshakable place for himself in history by hefting mighty objects, and strong men the world over have since labored to emulate him. But the modern food processor and manufacturer of dry and liquid seasonings is seldom naturally equipped for such activity. Therefore to transport and store the heavy, awkward bags of spices his products require, he must perforce hire warehouses, trucks and several muscular, 20th century Samsons!

● Not so the manufacturer who has discovered **SPISORESINS!** For **SPISORESINS** require no more space than the neat, compact essential oil bottles on his plant shelf, and are as easy to use. Pourable, of superior flavor value, entirely free of mold and yeast spores, **SPISORESINS** simply eliminate the storage problem. A 5 lb. bottle of **SPISORESIN** Black Pepper is equal in flavor value to a 150 lb. bag of the spice itself. Solvent extractions of natural spices, **SPISORESINS** are available in all important Basic flavors and over 60 different Compounds.

● Give your products a "taste-lift"—your entire operation a "convenience-lift". Let the small bottle of **SPISORESINS** *retire* the extra warehouse, the truck, the sanitation problem, and the "Samsons" to the glorious, but inconvenient, past.

* Reg. U. S. Pat. Off.

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ATLANTA · BOSTON · CHICAGO · CINCINNATI · DALLAS
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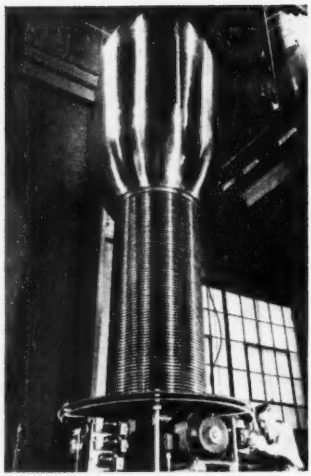
ESSENTIAL OILS • AROMATIC CHEMICALS
PERFUME BASES • VANILLA • FLAVOR BASES



Shelf-Life "Artillery"

Potential value of electronic radiation of foods for prolonging their shelf-life is being explored with the use of this Van de Graaf electronic generator. In experiments conducted thus far, some radiated canned goods—meat, vegetables, and fish—have subsequently been kept at room temperature for as long as four years. Unit was designed by High Voltage Engineering Co. of Cambridge, Mass. Spincraft, Inc., Milwaukee, fabricated terminal cap (top) from Armco stainless.

Members are: Duffy-Mott Co., Inc., New York City; Comstock Canning Corp., Newark, N. Y.; Haxton Foods, Inc., Oakfield, N. Y.; Knouse Foods Coop., Inc., Peach Glen, Pa.; Lyndonville Canning Co., Inc., Lyndonville, N. Y.; C. H. Musselman Co., Biglerville, Pa.; National Fruit Products Co., Inc., Winchester, Va.; and Berks-Lehigh Fruit Growers Assn., Fleetwood, Pa.

Sweet Potato Flour

Experiments at the Indian Food Technological Research Institute at Mysore, India, have established a recommended method of making sweet potato flour as a substitute for cereal flour.

Even though it contains no gluten and the protein content is poor, the product is termed a good substitute for corn flour, wheat flour or rice starch in the preparation of puddings, cakes and biscuits.

Initially, the skins of the sweet potatoes are removed, either with knives or by treatment with lye or steam. (It was found that no iron

(*Turn to page* 203)

REALISM...and a lot more

This page was prepared and produced — in its entirety — by Muirson Label Co.

Certainly your labels must capture the *full* depth and intensity of nature's own colors. But Muirson doesn't stop there. Because we *specialize* in labels, we give them top priority. You're sure they get designed, printed, and *delivered on time!* It's a unique service — worth investigating.

because MUIRSON *specializes* in LABELS

MUIRSON LABEL CO. INC. Complete plants in San Jose, Calif.; Peoria, Ill.; Meriden, Conn.

THE CARE AND NURSING OF TANK CARS

Don't build a fire...

use your steam coils

Another way to get more from your GATX tank cars

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So many people have requested reprints of these cartoon advertisements that we are making them available to you for use in your shops. Just write us.

should contact the tuber during preparation, since this results in discoloration of the flour.)

In lye peeling, the tuber is dipped in boiling caustic soda solution (3-4 percent) for 10-12 min. and the skin removed by washing in a stream of water. The residual lye is eliminated in a 2 percent citric acid bath.

In steam peeling, the tuber is cooked under pressure (10 lb. for 2 min.). The peeled product is cut lengthwise into 3-16 in. slices and dried.

The dried material comprises a bright yellow product easily convertible into flour. Moisture content of this final flour varies between 6-8 percent.

The composition of a representative

(*Turn page*)

Hors d'Oeuvres

• The California Department of Public Health is undertaking a series of nutritional analyses on the typical Mexican diet of beans, tortillas, tomatoes and cheese. Accurate results are expected as long as the investigators stay clear of all "hot tamales."

• *Norway, which uses whale steaks as a substitute for scarce meats, is now shipping this delicacy to the U. S. in the frozen form. Any gourmet running across a tough cut may be chewing on one of Jonah's well-seasoned boots.*

• Down in Miami, they've put a stop to the business of ice cream trucks touring neighborhoods with music boxes grinding out nursery tunes. Maybe it was a case of Mother Hubbard trying to keep Simple Simon from getting killed in the rush when the local Jacks and Jills came tumbling after.

• *Those kid comic characters of TV, movies, and otherwise, now decorating all the labels, are phenomenally boosting the sale of cereals, bread, milk, and fruit juices. Say, who controls the family purse-strings around here, anyway?*

• A local packinghouse worker's union in Ottumwa, Iowa, is demanding a free 15-lb. ham for each employee on Christmas and Easter eves. Next, they'll probably want their employers to bring home the bacon for 'em, too.

• *Disappearance of rye stocks in the 1950–51 season was the greatest since 1945–46. USDA puts the figure at 30.4 million bushels. What's the conversion factor from bushels to fifths?*

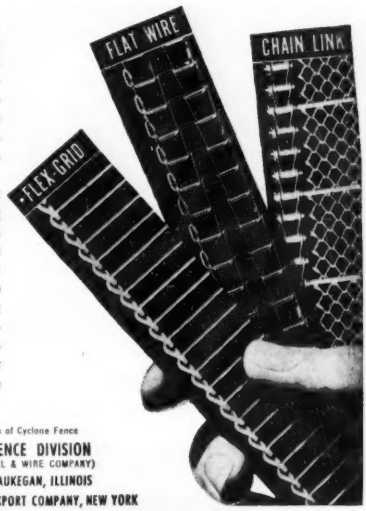
• By 1961, predicts Harvard Prexy James Conant, there'll be "cheap and harmless anti-fertility components to be added, as one sees fit, to the diet." . . . Being of a skeptical nature, we're going to sprinkle our first package in the vegetable garden—to see if it'll scare away those danged rabbits.

Triple Threat to Tie-Ups . . .

CYCLONE Conveyor Belts

Cyclone offers 3 types of conveyor belts — Flex-Grid, Flat Wire, Chain Link — in a wide variety of metals and alloys — designed to fit the operating conditions of every plant and give smooth, continuous service without unnecessary delays and tie-ups.

If you are planning a new belt installation or are remodeling your old one—get in touch with our nearest sales office and one of our engineers will help you select the belt best suited to your needs. Don't forget that Cyclone has 25 years of experience in the manufacture and installation of the best conveyor belts obtainable. Write for a free copy of our new catalog #4.



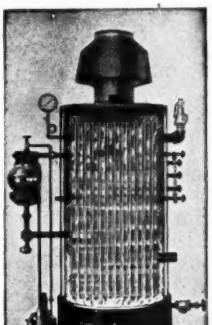
By the makers of Cyclone Fence

CYCLONE FENCE DIVISION
(AMERICAN STEEL & WIRE COMPANY)
Dept. H-101, WAUKEGAN, ILLINOIS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS

UNITED STATES STEEL

"UNITIZED" STEAM?



The KANE Boiler, built to A.S.M.E. specifications, in sizes to 30 H.P.

ECONOMICAL ANSWER...
the KANE BOILER PACKAGE

Here's a truly *"unitized"* steam supply—a compact, self-contained BOILER PACKAGE that is completely automatic . . . requires no attendant and only a bare minimum of floor space. The KANE BOILER PACKAGE includes: the correctly sized Automatic Gas-Fired Boiler complete with gas burner and controls to maintain required steam pressure; and an M-K-O Automatic Boiler Feed system designed to return condensate and supply make-up water as required for highest operating efficiency.

Engineered Steam at its best with four decades of experience at your disposal—so, send your steam problem to us for study and recommendation.

The M-K-O Automatic Boiler Feed returns condensate and supplies small quantities of hot water as needed to the KANE Boiler.

ENGINEERED STEAM AT ITS BEST

MEARS-KANE-OFELDT INC.

P.O. BOX 223 BRIDGEPORT, PA.

FOUR DECADES OF AUTOMATIC GAS-FIRED BOILER MANUFACTURING EXPERIENCE

SAYS

STOP

TO SOLIDS

Yarway
Fine Screen Strainers
prevent rust,
scale and dirt from
clogging
mechanical equipment.
Screens of woven
Monel wire, bodies and
screen caps
cadmium plated. Made in
10 sizes ¼ to 3"
Sold by 216 industrial distributors.
Write for Bulletin S-203.

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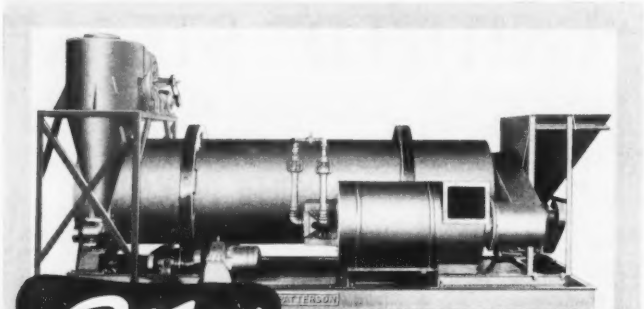
127 Mermaid Ave., Philadelphia 18, Pa.

YARWAY STRAINERS



Patterson PACKAGED DRYING UNIT

FOR FOOD MATERIALS

With this packaged Rotary Drying Unit, food materials are fed *continuously* through a special feeder directly to the sanitary interior of the dryer, and an uncontaminated, uniformly dried product is discharged *continuously*. Available in a number of standard sizes . . . 2', 2'6" and 3' diameters . . . and in lengths from 10' to 24'.

Richard L. Cawood
President

The Patterson Foundry and Machine Company
East Liverpool, Ohio, U. S. A.
NEW YORK, BOSTON, BALTIMORE, PHILADELPHIA, PITTSBURGH, DETROIT, CINCINNATI, CHICAGO, ST. LOUIS, HOUSTON, DENVER, LOS ANGELES, SAN FRANCISCO, SEATTLE
The Patterson Foundry and Machine Company, (Canada) Limited
Toronto, Canada
MONTREAL

sample (20 mesh) is as follows: Ash, 2.9; crude protein, 2.9; reducing sugars, 3.3; total sugars, 10.8; starch, 64.4; crude fiber and other carbohydrates (by difference), 19.3 percent.

Packaging Research

The food committee of the Packaging Institute, Inc., is slated to present a summary of its past-year work at the 13th Annual Forum of the Institute, scheduled Oct. 22-24 at the Hotel Commodore, N. Y. C.

Among the research projects being investigated by the committee, which is under the chairmanship of Dr. L. W. Elder of General Foods, are methods of obtaining moisture equilibrium data, means for maintaining atmospheres of known humidity, and determinations concerning free oils in foods.

List Fiscal Earnings

Increased sales and higher corporation taxes are still the order of the day. This is evident in the annual reports recently released by several large food companies.

Sales at Stokley-Van Camp, Inc., reached an all-time high of almost 115 million dollars, with net earnings after taxes just over 4.7 million.

Archer-Daniels-Midland Co. cleared just under 11 million dollars, with net sales for the fiscal year put at 240 million. This profit represented an increase of 15 percent over last year. ADM expects to market shortly a number of new products being developed in its recently expanded research facilities.

Net earnings of 2.7 million, reported by Pillsbury Mills, Inc., is an increase of 1 million over last year. The company reveals a net sales figure on the ¼ billion level. This favorable position is due primarily to more nearly normal margins on bakery flour products and in

soybean processing, as well as effective merchandising.

The Best Foods, Inc., reports a decrease in net earnings—though it boosted the dollar value of its total sales to almost 90 million dollars. Earnings were 4.8 million for the 1950-51 fiscal year.

Gordon Foods, Inc., upped its sales to 9.3 million dollars, but its profit figure of $214,000 was a bit lower than last year.

Storage Cave Ready

Just starting operations, the unique, underground, cold storage warehouse at Loring, Kan., is the second largest facility of its type in the world. The new venture is being run by the Natural Storage Co.

Converted from a limestone quarry, the cave offers a total of 2,400,000 cu. ft. of storage space. Temperatures of —10 deg. F. and also 34 deg. F. are afforded under refrigeration, along with the natural vault range of 50-55 deg. F.

It is vermin-proof and can handle unlimited floor loads. The construction costs (exclusive of refrigeration) were calculated at $1 per sq. ft.—a decided savings compared with above-ground structures.

Inspections at New High

A record volume of canned, frozen, and dried fruits and vegetables were inspected for quality and condition during the fiscal year ended this past summer.

Supervised by the Fruit & Vegetable Branch, Production & Marketing Administration, the checking covered over 150 million cases of canned fruits and vegetables; over a million cases of canned marine products; nearly a billion pounds of frozen foods; over 100 million pounds of dried and dehydrated products, and 83 million pounds of other processed products, such as honey and peanut butter.

During the inspection year, 134 fruit and vegetable processing plants owned by 104 companies were approved to pack under continuous Federal inspection. This represented an increase over the previous year in the inspections of canned fruits and vegetables and frozen fruits and vegetables. (10 percent and 45 percent, respectively). The rise was due to the greater number of plants approved to pack under this service and to larger production in the plants already operating under continuous inspection.

Fees payable from inspection totaled $1,739,000. This figure slightly exceeding the outlay for inspection

LA PORTE FLEXIBLE STEEL CONVEYOR BELTING

Whatever your process—canning, freezing, dehydrating or other operations—rugged, long-lasting LaPorte Belting *out-performs* all other types of belting. It quickly and safely carries your product through every processing job . . . from loading hopper to shipping room.

LaPorte flexibility insures tighter grip of belt on friction drum . . . can't creep, weave or jump. Provides perfectly flat surface for containers, empty or filled. Highly resistant to heat and cold. *Open mesh construction* permits faster, easier cleaning . . . makes possible the circulation of air, heat, cold or moisture around products in process. Choose LaPorte for extra trouble-free service.

Write at once for literature and prices—no obligation

LA PORTE MAT & MFG. CO.
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SYNTRON
"Vibra-Flow"
VIBRATORY FEEDERS
Provide Efficient, Controlled Bulk Material Feed

Their electromagnetic vibratory principle (no belts, gears, cams, etc.) means low cost handling of bulk foods — hot or cold, dry or damp, fine or coarse — at instantly controlled rates from pounds to hundreds of tons per hour.

Write for descriptive folder

SYNTRON COMPANY
460 Lexington Avenue Homer City, Penna.

• IN FOOD PROCESSING

When You Use Low Temperature

USE CORK

The time to make sure of your insulation protection is before you build or expand. Get the facts on Cork insulation when they can do the most good. Cork is so efficient in insulating properties that its performance has long been the accepted standard for low temperature requirements. Its wide usage in the refrigeration industry is due to its proved record for more than 40 years. Mundet refrigeration engineers are experienced in all details of temperature control. Write to us now for recommendations and estimates . . . let us help you secure the most profitable use of low temperature. Mundet Cork Corporation, Insulation Division, 7101 Tonnelle Ave., North Bergen, N. J.

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CORK INSULATION

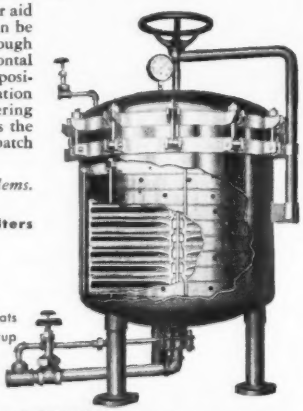
SPARKLER FILTERS

. . . for economical supreme quality FILTRATION

Sparkler filters are completely enclosed; are available in capacities up to 5000 G.P.H.; constructed of stainless steel or a variety of other metals to meet the requirements in filtering food products. All surfaces of the filter plates are thoroughly accessible for cleaning and insure a degree of sanitation impossible to equal with permanently assembled filter plates.

Diatomaceous earth, carbon or any filter aid and filter paper, cloth or any medium can be used with maximum efficiency. Flow through filter is always with gravity. The horizontal plates permit filter aids to be floated into position to form a cake of even thickness, filtration takes place uniformly over the entire filtering area. The patented scavenger plate filters the last drop, leaving no hold over in batch filtration.

We invite correspondence on your problems.



A few food products that Sparkler filters handle with ease:

Candy Scrap	Gums	Alkalies
Chicken Broth	Liquors	Beverages
Cider	Milk	Lard
Egg Albumen	Molasses	Deep Frying Fats
Extracts	Syrups	Beet Sugar Syrup
Flavors	Vinegars	Beer
Honey	Fruit Juices	Wines
	Alcohols	

SPARKLER MANUFACTURING COMPANY MUNDELEIN, ILLINOIS

personnel. The optional standardization and inspection service, which began in 1931, has expanded rapidly to a point where 33 offices were maintained during the year.

Development of new standards and revision of existing standards by PMA were continued. And Federal, state, county and city institutions were aided in formulating specifications in connection with purchases of processed products.

The U. S. Standards for grades of processed fruits and vegetables now total 103, including 70 for canned foods, 9 for dried, and 24 for frozen fruits and vegetables.

Ease Pay Regulations

Fruit and vegetable canners, working on government contracts of more than $10,000, will be relieved, until Dec. 31, of the necessity of paying time-and-a-half overtime pay.

This exemption from the Walsh-Healey Public Contracts Act was requested by the army so that canners would be able to meet needs of the armed forces.

Wartime Dairy Research

Dairy Products, seven chapter, 171-page paper bound volume, deserbes World War II research and development activities of the Food & Container Institute. Chapters deal with: Organization of Dairy Products

Tile-Making to Rations

Vitamin-enriched cereal and cocoa disks are being mass produced for army field rations by Gladding, McBean & Co., Los Angeles. Used are standard tile-making presses—modified only by the shape of the dies. The L. A. ceramics producer has also designed and installed a complete packaging line, where each disk is wrapped and heat-sealed in cellophane.

Branch, importance of milk and milk products in the soldiers' diet, fluid milk, evaporated milk, dehydrated milks and ice cream mixes, cheese, and spreads for bread. Copies may be obtained free from Chief, Technical Information Office, Quartermaster Food & Container Institute for the Armed Forces, 1819 W. Pershing Rd., Chicago 9, Ill.

Notes on Hearings Ready

Printed copies of the 1951 spring hearings of the Delaney Committee on chemicals in food products are now available. Containing 582 pages, the cloth-bound volume can be obtained through Government Printing Office, Washington.

USDA Grade Standards

Recent actions by Production & Marketing Administration of U. S. Department of Agriculture on U. S. Grade Standards and related activities include the following:

Shelled white spanish peanuts, revised, postponed: "After consideration of all relevant matters presented and the fact of disagreement among various segments of the industry as to certain of the proposals, USDA advises that additional research will be necessary before a revision of the standards can be made, and the U. S. standards for shelled white spanish peanuts, issued Aug. 15, 1939, shall remain in effect." Page 8420, Aug. 23 *Federal Register.*

Apples for processing, standards which have been in effect since Sept. 2, 1946, finally published in compliance with Administrative Procedures Act, page 8511, Aug. 24 *Federal Register.*

Pears for canning, standards which have been in effect since June 12, 1939, finally published in compliance with Administrative Procedures Act, page 8511, Aug. 24 *Federal Register.*

FDA Food Standards

Status of food standards of Food & Drug Administration in early September is reviewed below:

Booklet

Read the Label is title of new 40-page F&DA Misc. Pub. No. 3, available from Superintendent of Documents, Government Printing Office, Washington 25, D. C., for 15c. Designed as a consumer information booklet, it includes cartoon illustrations. Work on it began about two years ago.

Seafood Inspection

Frozen shrimp and iced shrimp

THIS PIPING MUST NOT BE SPRUNG···OR IT WILL BIND THE PUMP!
I'M MAKING SURE THE PIPING FITS THE UNION···I'LL PUT THIS SUPPORT UNDER THE PIPE TOO!
No. 2 OF A SERIES

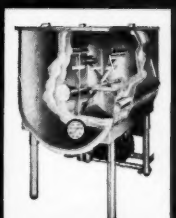
HOW TO GET THE MOST WORK OUT OF YOUR VIKING PUMPS

In making suction and discharge pipe connections on a Viking Rotary Pump be sure that no strain is imposed on the pump casing by the pipe. Properly installed, the shaft of a Viking pump should turn easily by hand. If this is not possible you have either sprung the pump in making the pipe connections or with the foundation bolts.

For valuable help in installing, operating and maintaining your pumps, write today for your FREE copy of the Viking Service Manual E. It's a handy, illustrated booklet filled with practical information. Get EXTRA wear out of your pumps by giving them EXTRA care. The Viking Service Manual E tells you how.

See Our Catalog In SWEETS

Viking PUMP COMPANY
Cedar Falls, Iowa



Base your measurements of standard SAN-I-TANKS on more than gallons alone. Through Metal Glass engineering they can be made to do a special job or adapted to combine several operations. This gives these tanks greater job capacity . . . and this advantage can't be measured in gallons.

The jacketed "CHR" tank, featuring the dimpled jacket construction for heating or cooling medium, is ideal for heavy or light food processing. The horizontal "wiping action" agitator keeps product from adhering to tank sides. Write for Bulletin CHR-50 today!

CHR...

···capacities beyond gallons!

CJ...

Type "CJ" is an open top, jacketed stainless steel tank that can be used for many types of hot or cold processing. Jackets for working pressures up to 150 p.s.i. For greater job capacity, tank can be equipped with side, bottom or top-entering agitators and all types of fittings and connections. Capacities: 60 to 1000 gallons. Write for Bulletin JS-50.

STAINLESS STEEL SAN-I-TANKS

METAL GLASS PRODUCTS COMPANY

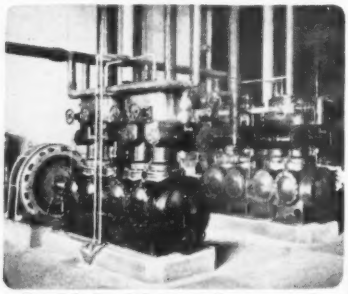
BELDING 6, MICHIGAN

New York Chicago Atlanta San Francisco Los Angeles Seattle New Orleans

BIG COLD STORAGE MODERNIZES with

FRICK Refrigeration

The three buildings of the Philadelphia Warehousing and C. S. Co. occupy a city block along the Delaware River water-front. Until recently the cold storages were cooled with steam-driven refrigerating machines installed in 1890 and 1911.



Two of the Four Frick Ammonia Compressors at the Philadelphia Warehousing and C. S. Co.

Today the cooling load is carried by four new Frick compressors, driven by electric motors totaling 775 hp. A battery of large shell-and-tube brine coolers was included in the modernization program.

Let us submit estimates on the up-to-date cooling equipment you may need: write, wire, phone or visit

DEPENDABLE REFRIGERATION SINCE 1871

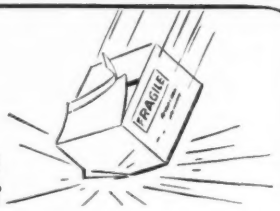
FRICK CO.

WAYNESBORO, PENNA., U.S.A.

Also Builders of Power Farming and Sawmill Machinery

BREAKAGE COSTS MONEY...

STANDARD CONVEYORS CAN AID YOU TO REDUCE IT



Put conveyors to work moving cases, cartons, packages, parts, units through manufacturing or processing to storage or shipping. Speed handling operations — reduce breakage — increase safety — save manpower, time, and costs.

An experience record of more than 45 years, serving all classes of industry and business, qualifies Standard to be of expert service to you on any "package" conveyor need — roller, belt, slat, chain, push-bar, sectional, portable self-contained units — spiral chutes — pneumatic tube systems. Write—Address Dept. 000.

STANDARD CONVEYOR COMPANY

General Offices: North St. Paul, Minnesota

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Standard

Write for valuable reference bulletin No. 308 — address Dept. FE-101

Schedule of Events

October

14–16—Small Brewers Assn., annual convention; Edgewater Beach Hotel, Chicago.

14–17—Packaging Machinery Manufacturers Institute; Mid Pines Club, Southern Pines, N. C.

14–18—American Bakers Assn., annual convention; Hotel Sherman, Chicago.

16–19—Second International Congress of Canned Foods; Paris.

22–23—American Butter Institute, annual convention; Drake Hotel, Chicago.

22–24—Packaging Institute, 13th annual forum; Hotel Commodore, New York City.

22–24—International Assn. of Ice Cream Manufacturers, 47th annual convention; Book-Cadillac Hotel, Detroit.

22–25—National Coffee Assn., annual convention; Hotel del Coronado, Coronado, Calif.

24–26—Milk Industry Foundation, annual convention; Hotel Statler, Detroit.

24–26—National Pickle Packers Assn., annual meeting; Sheraton Hotel, Chicago.

November

1–2—Time-Motion Study and Management Clinic, 15th annual; Sheraton Hotel, Chicago.

5–8—All Industry Refrigeration & Air Conditioning Exposition, 7th annual; Navy Pier, Chicago.

12–14—Grocery Manufacturers of America, 43rd annual meeting; Waldorf-Astoria Hotel, New York City.

12–15—National Automatic Merchandising Assn.; Auditorium, Cleveland.

12–15—American Bottlers of Carbonated Beverages, annual convention; National Guard Armory, Washington, D. C.

13–16—National Assn. of Ice Industries, 34th annual convention; Shamrock Hotel, Houston, Tex.

26–Dec. 1—Chemical Industries, 23rd exposition; Grand Central Palace, New York City.

products would be covered by the F&DA seafood inspection service, in addition to canned shrimp already so covered, if proposed regulations are adopted. Interested shrimp packers were given until Sept. 21 to comment on the proposed regulations, appearing on page 8370 of the Aug. 22 *Federal Register*. Inspection service would be optional, covering canned shrimp or frozen shrimp or fresh shrimp or any combination thereof, or no inspection at all.

Future Hearings

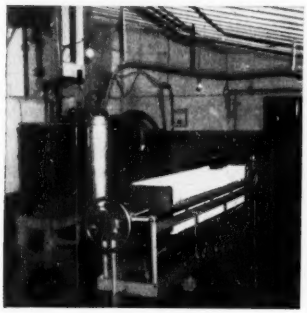
1. *Canned pineapple and canned pineapple juice*, new, standards of identity, quality, and fill of container. Oct. 30 set as date for hearing to begin, revised proposed standards appearing on page 8743, Aug. 29 *Federal Register*. B. D. Levinson has been designated to preside.

2. *Salad dressing*, rehearing standard of identity: No change since

"Filtered Apple Juice Sells Best,"

SAYS

CHARBONNEAU



On the Pacific coast and the western states consumers prefer brilliantly clear apple juice.

To meet this requirement Charbonneau Packing Corporation of Selah, Washington, installed a Hercules sheet filter, Model L 16/100, with capacity sufficient to give a high degree of clarity to 6000 cases of apple juice and cider per day with capacity to spare for greater output. This output has been doubled over the past year.

It is significant, Mr. Charbonneau states, that where clear filtered apple juice is offered, per capita sales are higher than where unfiltered cider is marketed.

Hercules filters are extensively used for filtering and polishing all types of alcoholic and non-alcoholic beverages with complete success.

Other uses include wines, whiskies, edible oils, syrups, coffee extracts, condiments, soups, and water. Also a long list of pharmaceuticals, chemicals, and cosmetics.

Write for full particulars of the modern Hercules filter for your specific filtering purpose.

HERCULES FILTER CORP.
210–21st Ave. PATERSON, N.J.

last month (see FOOD ENGINEERING, Sept. 1951, page 194).

3. *Process cheese food*, amendment, standard of identity: No change since last month.

4. *Canned tuna*: No change.

5. *Frozen vegetables*: No change.

Hearing in Progress

Ice cream, new, standard of identity. Resumed Sept. 5, with a short discussion of flavorings. Sherbets and ices, miscellaneous items, frozen custard and French ice cream were to follow, for about two weeks. A recess until Nov. 5 was then planned at which time testimony relative to the harmlessness of surface active agents was to begin. Oct. 10 was set as an intermediate date by which exhibits bearing on the matter of harmlessness of surface active agents were to be filed with the clerk.

Following the direct testimony scheduled to begin on Nov. 5, a two-week recess was planned before cross examination of those witnesses. This agreement on method of presenting the highly controversial subject was proposed by the attorney for Atlas Powder Co., with the concurrence of the attorneys for Swift & Company and the F&DA.

A few specific exceptions to the above schedule were anticipated, and allowance was made for testimony from other interested parties not now known to F&DA. A letter setting forth this schedule was to be issued by the presiding officer to all known interested parties.

Tentative Orders Awaited

1. *Residue tolerances*, on fresh fruits and vegetables, new: No change since last month.

2. *Margarine*,. amendments, standard of identity: No change.

3. *Canned tomatoes*, amendment, standard of identity. Expected soon; no briefs filed by Aug. 31 deadline.

Final Orders Awaited

1. *Bread*, new, standard of identity: No change.

2. *Frozen fruits*, new, standards of identity and fill: No change.

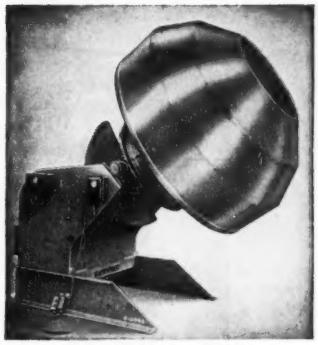
3. *Canned mushrooms*, amendment, standards of identity and fill: No change.

4. *Fruit preserves, jellies, and butters*, amendment, standard of identity. Expected soon; only exception filed by Aug. 19 deadline was from Sugar Information, Inc., which objected to elimination of label declaration of non-sucrose sweeteners.

Standards Completed

None since reported last month.

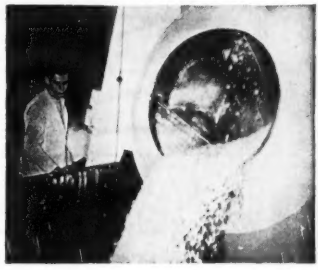
—*End*



Handle LARGER Batches

. . . Discharge

AUTOMATICALLY



Now you can do more mixing in less time—with the Worthington-Ransome Rotating-Tilting Pan-Type Mixer.

The drum is not only motor-*rotated* . . . it's also motor-*tilted*. Push-button tilts drum to any angle while rotating —materials discharge *completely*, with no nuisance of scooping.

Capacities up to 3000 lb. reduce handling and re-handling and increase output.

Widely used for coating, coloring, tumbling, polishing and finishing on candies, gum, drug tablets, etc.—mixing powdered milk, relishes, dry gelatin, etc.

Write for Bulletin R-708 on Worthington-Ransome Mixers, built from designs developed from nearly a century of mixer experience.

WORTHINGTON

WORTHINGTON PUMP AND MACHINERY CORP.
RANSOME INDUSTRIAL MIXER DIVISION
DUNELLEN, NEW JERSEY YR.O.4

DETECTO SCALES

There's a precision-accurate Detecto Scale for your specific weighing and counting need. The Detecto helps increase production, yet assures you maximum accuracy by making slightest weight discrepancies immediately visible.

DETECTO-GRAM HEAVY DUTY SCALE

To speed up heavy duty weighing operations. Detecto-Gram Scale Model #1744 insures against overweight losses. Shows weighing error promptly. Famous for hair-line accuracy.

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NOVEMBER 26 to DECEMBER 1

Having first-hand knowledge of the newest chemical creations . . . of latest trends and developments in chemical processing equipment, materials, methods, and techniques . . . was never more important than NOW. You need this information to successfully cope with the unprecedented production demands, rising costs, material shortages, regulations, and other new problems of today's defense economy. In no other way can you get so much help . . . on so many problems . . . in so little time . . . as at this great Exposition.

Plan now to attend. It is a timely opportunity for you and your associates to:

1. **OBSERVE** and **STUDY** over 400 informative exhibits and first-hand demonstrations of 247 different kinds of products for all phases of the chemical industry.
2. **EXAMINE** equipment for related fields—it may suggest improvements for your plant or products.
3. **INVESTIGATE** the latest developments in structural materials which are revolutionizing equipment design.
4. **SURVEY** the latest precision apparatus for testing characteristics of manufactured products and controlling quality.
5. **INSPECT** new methods of packaging—new processing and handling equipment—new laboratory and process instruments.
6. **DISCUSS** *personally* your problems on availability of materials and equipment, with technical men in your own and related fields.
7. **LEARN** about the new materials and methods of saving production time and costs.
8. **INCREASE** your importance to your company by informing yourself about advances demonstrated at this Exposition. In this way you will be better equipped to improve the operating efficiency of your plant.

Management International Exposition Co.

Freeze Concentration

—Continued from page 71

monwealth Engineering developments go beyond freeze concentration. The company has developed new fruit preparation and juicing equipment to be used in conjunction with the freeze-concentrator.

First is a peeler, also dubbed a deoiler because of its dual function. Driven by a ¾-hp. motor, its capacity is sufficient for a 250,000-gal. plant. The machine takes spray-washed fruit of any size—from tangerines to grapefruit—and abrades the skin off down to the albedo, or white inner skin. The fruit is held loosely between metal fingers, so that it is free to turn on all axes, and carried around in a circle between the walls of two rotating concentric drums covered with detachable abrasive canvas. After rough peeling, the fruit drops to a second set of drums for the final touch. In this machine, the rotating drums and fruit-carrying fingers travel in the same direction but at different speeds. As the peel is removed in granular form, it is washed away with water, together with the peel oil and most of the bacteria on the peel or in its pores. The juice contains only 0.002 percent of peel oil.

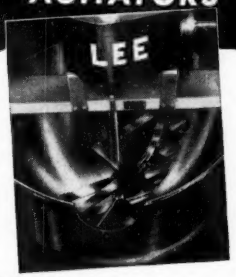
As the fruit leaves the peeler-deoiler, it passes under a water spray and onto a grading belt for inspection to remove poorly peeled fruit and that which is bruise-spotted, a condition which may not show until the peel is removed. Then it goes into a new juicer designed to handle fruit of all sizes.

Also a simple piece of equipment, the juice extractor consists of a rotating horizontal cylinder, inside of which is a second smaller cylinder turning on another axis. At the closest point, the inner cylinder is 1½ in. from the outer cylinder and is held flexibly in place by a strong spring. The fruit then is carried through the 1½-in. opening by the rotation of the two cylinders, the pressure "exploding" the juice cells to effect a self-purging extraction. It takes 1 hp. to drive the extractor, one of which has enough capacity to serve one 250,000-gal. (per season) freeze concentrator.

Commonwealth reports that 95 percent of the seeds are unbroken and that there is virtually no seed oil in the juice to impart a bitter taste. The seeds, of course, can be collected, dried and the oil extracted.

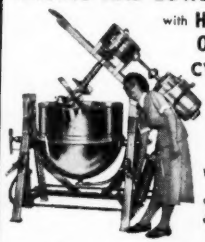
Containing some pulp, seeds, and rag, juice from the extractor goes through a finisher. Essentially vibrat-

Complete
PRODUCT MIXING
with
LEE DOUBLE-MOTION Center Line Scraper AGITATORS



Standard equipment for over 20 years.

Safe Controlled
RAISING AND LOWERING
with Hydraulic Operated CYLINDER



Operates directly from your present water system

Swings out FOR EASY CLEANING

Cleaning over kettle means

- No hot messy parts to disassemble
- Savings in time and labor
- No contamination of parts

Our descriptive bulletins on these units will interest you—*WRITE FOR THEM.*

LEE METAL PRODUCTS CO.
416 PINE STREET
PHILIPSBURG, PA.

ALL LEE KETTLES ARE MADE TO A.S.M.E. CODE

ing screens, the finisher separates the juice, seeds, pulp and rag, the latter being suitable for cattle feed as is. The pulp is stored under refrigeration and later put back into the finished concentrate. Clear juice is conducted through a cooler to a raw juice storage tank to be held at 34 deg. F. until pumped to the concentrator. Blends for flavor can be made at this point.

Commonwealth reports that the refrigerated extracted juice can be held 7 to 14 days before concentrating, without developing an "off taste".

Quality Tests Surprising

It is to be expected that freeze-concentration will protect the flavor of heat-sensitive fluids. But not so obvious are some other quality characteristics reported by Commonwealth. And these point to the possibility of selling the concentrated juice without freezing it.

Some 40-deg. Brix juice was put into six beer bottles and shipped unfrozen from the Dayton pilot plant to Florida. These bottles were kept at room temperature, and one was opened and sampled every two weeks. The flavor is reported to have been good to the last. Other tests have shown similar results.

A 60-deg. Brix concentrate was allowed to stand at room temperature for two months and then sent to Dille Laboratories, Dayton, for analysis. According to the lab report, the juice "showed a homogeneous consistency free from any noticeable precipitate and gave an average bacterial count of 2 per ml. of juice. Many of the plates were completely devoid of growth. The can showed no evidence of increased pressure and there was no unpleasant odor detectable."

Commonwealth attributes this satisfactory condition to removal of bacteria from the fruit by abrasive peeling and washing—and it speculates, on the basis of lab tests, that the bacteria count of the freeze-concentrated juice decreases on storage as a result of a naturally occurring antibiotic which is preserved by the process.

The juice, of course, passes through an almost closed cycle from extraction to can filling. And in the National Juice Corp. plant in Florida, germicidal lamps give added protection against bacteria and mold. However, it will take commercial experience with the process to determine whether results are as phenomenal in full-scale operations.

Costs and Space Favorable

Space requirements for a one million gallon (per season) StepFreeze citrus juice plant are calculated by

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SCHUTZ-O'NEILL Pulverizers are made in 6 sizes with capacities up to 2000 lbs. per hr. Also Gyrator Sifters, Roller Mills, Receiver Boxes, Collectors, Hammermills, etc.

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Commonwealth at 5,000 sq. ft., in a building with a 20-ft. ceiling. This makes it a rather neat package.

Estimated equipment costs are: Freeze-tanks, $40,000; collector tanks, screws and ducts, $3,000; centrifugal equipment, $10,000; automatic controllers, $5,000; automatic valves and piping, $6,000, installation and engineering, $8,000; and refrigeration, $25,000. This adds up to an economical $97,000.

Here is another enlightening estimated cost breakdown, in dollars per gal. of 42-deg. Brix juice:

Labor	$0.0382
Power & water	0.0250
Maintenance	0.0200
Royalties	0.0500
Depreciation	0.0250
Rent, building	0.0036
Insurance, taxes, licenses	0.0128
Miscellaneous	0.0150

Including $0.3643 for cans and $0.0286 for cartons, processing cost is estimated at $0.5805 per gallon of the 42-deg. concentrate. Adding administrative, advertising, inspection and testing costs, the figure comes to $0.6474 per gallon. These costs estimates put StepFreeze concentrate into a good competitive position. Naturally, only commercial operation can establish the accuracy of the estimates.

The equipment is built of stainless steel for product protection and sanitation, and it is designed for easy cleaning. The system can be flushed out with water or detergent solution, and the refrigerated cylinders can readily be removed from the freeze tanks.

About StepFreeze, Inc.

StepFreeze not only controls the patents covering the concentrating process, but it owns 70 percent of the common stock of Extraction, Inc., which has the peeler-deoiler and juicer used in the StepFreeze operation.

StepFreeze will grant licenses under a royalty arrangement. It will do plant and process engineering for licensees, at a charge. And it will carry on research and development work.

And the activities do not stop here. The firm also will merchandise such concentrates as it may desire to produce under its own brand names and distribute these through subsidiary organizations.

In the merchandising plans is an angle for the small operator. The intent is to make it feasible for an individual grower to operate a small concentration plant and sell his product without the need for a merchandising organization.

It is here that the concept of a central packing plant for tank-trucked concentrate comes into the picture.

End (Resume reading on page 72)

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One of our technical men will be pleased to consult with you. No obligation! Special Products Division, STANDARD BRANDS INCORPORATED, New York 22, N. Y.

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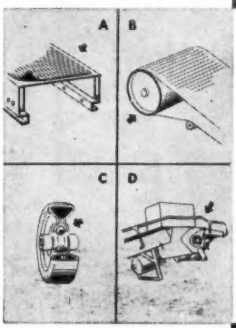

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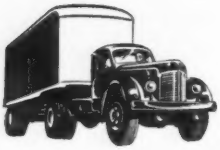

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Men & Companies

Industry

American Dairies, Inc., announced through President P. Reid Oliver, purchase of the Hudson Dairy Co. from the Valley Farms Co., Paragould, Ark.

American Maize-Products Co., recently appointed H. R. Maroney as eastern division manager of the package sales department.

Carolina Frozen Foods, Inc., Henderson, N. C., has been issued a certificate of incorporation to operate cold storage plants.

Concentrates Marketers, Inc., nas appointed R. J. Moone, Gerald F. Morrow, and Joseph L. Bachand as vice-presidents of the corporation.

Consolidated Grocers Corp., Inc., has acquired the Fred M. Drew Co., Inc., food packing plant at Santa Clara, Calif. The plant has an annual capacity of 400,000 to 500,000 cases of canned goods which include apricots and peaches.

General Foods has moved the headquarters offices of its Maxwell House Div. to Hoboken, N. J.

The Herman Sausage Co., Tampa, Fla., has named Burnell Gardner executive vice-president of the firm, succeeding Paul A. Tarnow, resigned. Gardner has been sales manager for the past two years.

National Starch Products, Inc., recently announced appointments of Dr. R. W. Merritt and S. F. Thune as assistant vice-presidents of the company.

Lawrence J. Jacobs is new sales promotion manager for Amino Products Division, International Minerals & Chemical Corp.

C. S. Anger has been promoted to the position of eastern area sales manager of the H. J. Heinz Co.

Planters Nut & Chocolate Co. is planning a $2,000,000 plant expansion in San Francisco, starting with the purchase of a 72,000-sq. ft. building costing $920,000. Additional buildings on this newly acquired 6½-acre site are planned.

Standard Milling Co., Chicago, recently named Paul Uhlmann as chairman of the board of directors and Ralph Friedman as chairman of the newly created executive committee. Added to board of directors were H. M. Stein and Arthur Mag.

Washington Cooperative Farmers Assn., Seattle, announces plans for building a $2,000 turkey and poultry processing plant near Sunnyside, Wash.

The Webb Corp., brewing company of East Liverpool, Ohio, recently made several changes in management: W. J. Bamer succeeds D. A. Olivo as president, and H. B. Barth is new secretary-treasurer.

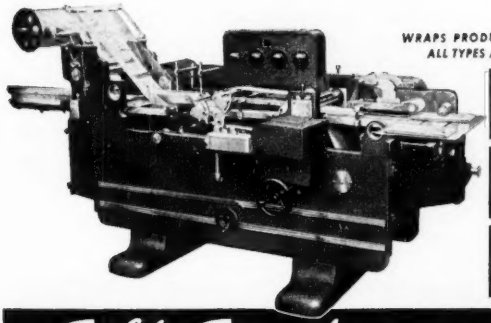
Willapa Oyster Farms, Seattle, has purchased all properties of the Ilwaco Oyster Co. for $500,000, called largest sale ever reported in Washington State oyster industry.

Zero Frosted Foods Co. has been organized to handle distribution of Libby's frozen foods in New Orleans.

Personnel

John M. Anderson has been named assistant director of promotion for the Tea Bureau, Inc.

Harry Archer has been appointed assistant to Roy E. Wooster, vice-president in



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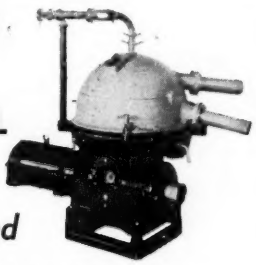

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William Geisler has been elected vice-president of Nedick's, Inc., and assistant to the president.

---

charge of Borden Co.'s ice cream division.

John W. Baker has been appointed chief of the Fats & Oils Branch of the Food & Restaurant Div. of the Office of Price Stabilization, Washington, D. C. He replaces Nelson H. Eddy, who will continue to serve the division as a consultant on a part-time basis.

Arnold Kent Balls has left the Enzyme Div., Western Regional Research Laboratory, Albany, Calif., to accept a position as professor of enzyme chemistry, Purdue University.

J. E. Countryman has been made manager, eastern canned foods production of California Packing Co., succeeding the late L. S. Argall.

L. R. Cousins has been elected president of the newly organized North Atlantic Lobster Institute.

Thomas Cuneo has been re-elected president of the National Food Distributors Assn.

Dr. C. R. Elsey, of British Columbia Packers, Ltd., Vancouver, B. C., has been re-elected president of the Pacific Coast Oyster Growers Assn. W. Arnold Waring, of Haynes Oyster Co., Seattle, and Charles R. Pollock, Seattle, were named, respectively, vice-president and secretary-treasurer.

Donald MacLean is new president of California & Hawaiian Sugar Refining Corp., succeeding Earl B. Wilson, resigned.

W. R. Monro was recently named new division manager of Huron Milling Co., with offices in Cincinnati. His territory will extend through the middle western and southern states.

Bill O'Brien has been transferred from the Chicago laboratory of Florasynth Laboratories, Inc., New York, to the Los Angeles sales office. He will act as assistant to the general manager.

B. C. Olney recently retired as vice-president of General Foods Corp. Since 1950 he has been assistant to the chairman and the president.

Robert J. Remaley will join the staff of the American Dry Milk Institute. He will be in charge of scientific development.

Max Sherman, in charge of sales for Peter Paul candies in northern California, has been named assistant to H. M. Billings, national sales manager of the organization.

Fred S. Wyatt has recently been appointed director of the produce department for the entire organization of Gerber Products Co.

Associated Industry

Aluminum Co. of America is expanding its research facilities through erection of a new building at the company's laboratories, New Kensington, Pa.

Cornell Paper Board Products Co. and its Hummel and Downing Division have combined to form the Cornell Wood Products Co. The change was made to more accurately describe the products which this firm manufactures.

Corning Glass Works recently appointed Dr. Edward U. Condon, noted nuclear physicist, as director of research and development.

H. L. Thomasson, president-elect of the International Assn. of Milk & Food Sanitarians, Inc., has been appointed to the full-time position of executive secretary of the association and business manager of the "Journal of Milk & Food Technology".

"The Use of Amerio Freezers Is Proven as far as we are concerned. They are Practical and Efficient." So says Omaha Cold Storage Co. under date of June 13, 1950.

2 of a Battery of Amerio Positive Contact Plate Freezers doing quick, quality freezing of Poultry in the plant of the **OMAHA COLD STORAGE CO., Omaha, Neb.**

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Economical and Speedy Flat, Well-formed Packages

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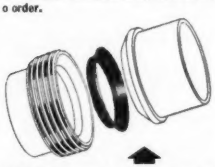

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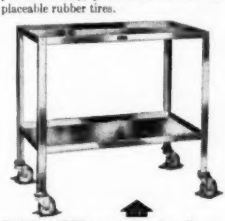

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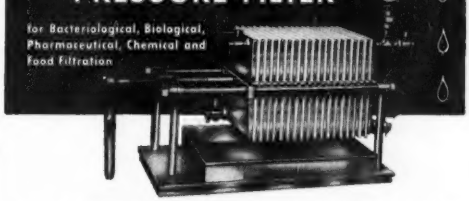

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Every part coming in contact with liquid is HIGHLY POLISHED . . . permitting easy and thorough cleaning of the filter, assuring better and more positive filtration. Quickly opened and closed. Flexible for double filtration. No rubber washers. Uses any type filter pad, paper or cloth.

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161 E. Grand St. Chicago 11, Ill. | 13 E. 8th St. Cincinnati 2, Ohio | 383 Brannan St. San Francisco 7, Cal.

H. G. Bratt recently was appointed general manager of manufacturing, metal division, Continental Can Co.

Charles Beck Machine Corp., Philadelphia, recently announced election of the following officers: Milan F. Dudeff, vice-president, sales and engineering, and Henry E. Scherer, secretary. Carl A. Beck and Richard H. Beck continue as president and vice-president, respectively.

Crown Can Co. has named Howard Eddy new company treasurer.

Hamilton Copper & Brass Works, Hamilton, Ohio, announces purchase of the Bucyrus Kettle Works, Bucyrus, Ohio. The latter's line will be continued under the old name.

Industrial Tape Corp., a subsidiary of Johnson & Johnson, New Brunswick, N. J., has named Steven J. Geoghegan vice-president in charge of materials control.

Leeds & Northrup Co. recently elected Dr. Raymond C. Machler director of research and named him to the executive committee.

Lyon-Raymond Corp. has changed its name to **The Raymond Corp.**, since "the name 'Lyon' has no connection with the present company management and because it has on occasion caused some confusion with other similarly named manufacturers."

National Flexible Packaging Assn. has announced appointment of John M. Cowan as managing director.

Rietz Manufacturing Co., San Francisco, has removed the company's main office and plant to Santa Rosa, Calif., where new buildings are being completed.

Shell Chemical Corp. will add a new synthetic ammonia plant to its manufacturing facilities at Dominguez, Calif., near Los Angeles.

Whitney Chain Co., Hartford, Conn., has transferred its Woodruff division to The Standard Steel Specialty Co. The assignment includes the division's manufacturing equipment, stock inventory, and goodwill.

Wyandotte Chemicals Corp. recently promoted John D. MacGillivray to be manager of food and beverage manufacturers' sales. Mr. MacGillivray will be associated with Fred King, manager of the food, beverage and special detergents department.

Deaths

Leland Stanford Argall, 59, director and vice-president of California Packing Corp., San Francisco—July 31.

John K. Bainbridge, 40, vice-president and director of Supplee-Wills-Jones Milk Co., Philadelphia.—September 8.

William P. Baker, 60, president of Regal Amber Brewing Co., San Francisco, Calif.—July 11.

Frank M. Ford, 55, manager of Beatrice Foods Co.'s Cadillac, Mich., plant.—Manton, Mich.

George Frederick Shoff, 75, owner of Sho-Off Orchards Products Co., Peoria, Ill.—August 23.

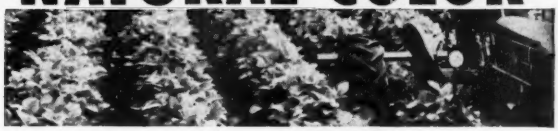
Charles E. Stuart, Sr., 59, president and chairman of the board of directors, Stratford Packing Co., Richmond, Va.—July 31.

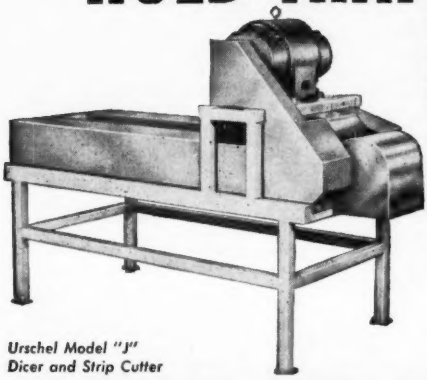
John T. Tenneson, Sr., 57, president of Superior Packing Co. and Pyramid Fisheries Co., Tenake Springs, Alaska.—August 4.

Alfred G. York, director and vice-president of Watson-Stillman Co., Elizabeth, N. J.

F. E. Bensen, Jr., was recently named advertising manager at Canada Dry for all carbonated beverage operations in the United States.

HOLD THAT NATURAL COLOR





Urschel Model "J"
Dicer and Strip Cutter

When Cutting
Spinach, Collards, Mustard and Turnip Greens

By cutting greens (both leaves and stems) into ¼" squares and blending the two colors, more and more food packers are achieving a savory, appetizing appearance in the finished product.

THE URSCHEL MODEL "J" DICER

- ■ *cuts entire plant into ¼" squares,*
- ■ *eliminates identity of stems as stems,*
- ■ *speeds filling and product handling.*

URSCHEL LABORATORIES INC.
VALPARAISO, INDIANA

manufacturers of precision, high speed cutting equipment for delicate food products

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STEEL-PARTS Mfg. Co.
Solves Your Problem with "METALOK" Lightweight Roller and Skate Wheel Conveyors

• Steel Parts — famous for custom engineered steel belt conveyors — offers the new Steel Parts *Metalock* lightweight roller and skate wheel conveyors. These new low cost ball bearing gravity conveyors will cut handling costs and speed production because they are engineered to do your job with maximum efficiency. Get full details on these new Steel Parts Metalock lightweight gravity conveyors NOW.

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Model 614
Illustrated
(6" pitch,
14 gauge links)

STEEL-PARTS
Makers of America's Most Complete Line of STANDARD STEEL BELT CONVEYORS

Steel-Parts steel belt conveyors give you a clean, flat sagless surface of steel . . . easy to clean, economical to use. If you need one conveyor or an entire conveying system — Steel-Parts have just the right unit, engineered to do your job best.

Steel-Parts Mfg. Co. FE-10
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- ☐ Please send me complete information, including engineering data on your new Gravity Conveyors.
- ☐ Send full details and specifications, including engineering data, on your Steel Belt Conveyors.
- ☐ Have your engineer call to discuss our problems.

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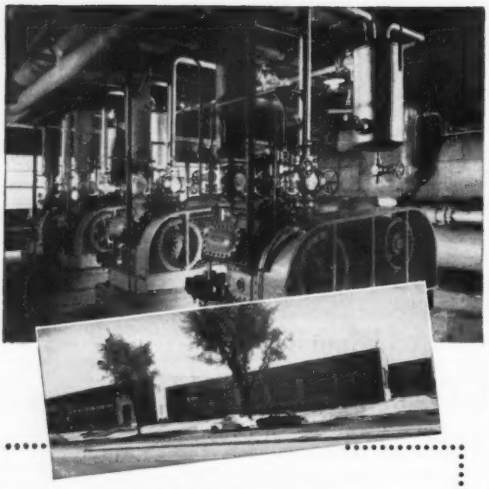


It's VILTER Again—

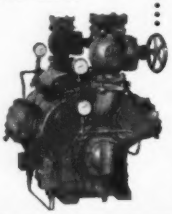
IN NATIONAL DAIRIES' NEW MILWAUKEE PLANT

● When National Dairies engineers were considering refrigeration for the contemplated new Luick Ice Cream Company plant, they naturally gave thought to the equipment which had faithfully served through the years. They discovered that Luick had bought their first Vilter compressor in 1911 and has been buying Vilter ever since.

Refrigeration had advanced over the years, along with the process of ice cream manufacture, so no thought was given to moving the old equipment, but rather toward buying an entirely new system. Promised efficiency improvements were realized through the installation of the four Vilter multi-cylinder compressors shown, three twin cylinder boosters, shell and tube condensers, and other equipment.

Dairies, ice cream plants, and food processors have known for years that they can depend upon Vilter. You'll find them re-ordering Vilter, as Luick has done, time after time, because they've found that Vilter saves them money in upkeep, in operating costs, and in lack of costly "down time."

Let your nearest Vilter Representative or distributor show you how you can save with Vilter.



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Ammonia and Freon Compressors • Pakkers • Evaporative and Shell & Tube Condensers • Pipe Coils • Valves and Fittings • Can Ice Plants

Recent Inventions

Method of Protecting Unbaked Pastry Dough From Deterioration By Contact With Filling By Interposing a Thin Layer of Non-Liquid Edible Fat—*N. A. Hanau, Essex Fells, N. J.* No. 2,547,206. Apr. 3, 1951.

Meat Tendering Machine Composed of Rotary Gang of Disk-Like Knives With Interposed Stripping, and Knife-Cleaning Fingers—*W. F. Spang, Milton, Mass., to Cube Steak Machine Co., Needham Heights, Mass.* No. 2,547,234. Apr. 3, 1951.

Method of Refining Milk Fat by Chilling Milk and Exposing Surface to Live Steam to Melt Fat Which is Continuously Removed and Separated—*U. N. Petty, Cushing, Okla.* No. 2,547,281. Apr. 3, 1951.

Beet Sugar Juice Purified by Predefecation and Main Defecation With Lime and Saturation With CO_2 Followed by Separation of Precipitates—*O. Wiklund, Malmo, Sweden to Svenska Socker-fabriks Aktiebolaget, Malmo.* No. 2,457,298. Apr. 3, 1951.

Pasteurizer Control System Incorporating Differential Pressure Switch Which Stops Pump if Pressure of Pasteurized Liquid Exceeds That of Unpasteurized Liquid in Regenerative Section—*C. F. Aldridge and C. L. Brown, Rochester, N. Y., to Taylor Instrument Cos., Rochester.* No. 2,547,430. Apr. 3, 1951.

Machine for Depositing Nuts on Candy Bars Comprising Hopper and Rotating Pocketed Drum for Ejecting Nuts on Belt-Conveyed Bars—*L. H. Zeun, Naugatuck, Conn., to Peter Paul, Inc., Naugatuck.* No. 2,547,516. Apr. 3, 1951.

Method of Preparing Unfermented Bread by Adding Granulated Solid CO_2 to Dough—*W. A. Cohoe, New York.* No. 2,547,566. Apr. 3, 1951.

Method of Producing Bacon Rind Product by Cooking Skin Under Steam Pressure to Soften and Remove Fat and Oil, Forming Uniform Pieces, Recooking Until Puffed and Salting and Cooling—*G. A. Darrow, Glendale, Calif.* No. 2,547,747. Apr. 3, 1951.

Process for Improving Foam of Fermented Malt Beverages by Adding Solution of Water-Soluble, Heat-Stable Carboxy-Methyl Cellulose—*J. S. Wallerstein, A. L. Schade, and H. B. Levy, New York City, to Wallerstein Co. Inc.* No. 2,547,988. Apr. 10, 1951.

Process for Manufacturing Glutamic Acid From Steffin's Filtrate by Hydrolyzing, Adjusting pH to 1.6, Separating Salts and Insolubles, Readjusting pH to 3.2—*A. J. Schlaeger and F. A. Hoglan, Toledo, Ohio, to International Minerals & Chemical Corp., New York.* No. 2,548,124. Apr. 10, 1951.

Process for Removing Excess Tartrates From Grape Extracts by Adding Aqueous Slurry of Calcium Salt Complex at pH 7.8-8.2—*J. B. Edmonds, Baltimore.* No. 2,548,594. Apr. 10, 1951.

Process for Clarifying Sparkling Wines by Performing Secondary Fermentation in Bottle, Centrifuging and Freezing Neck of Bottle to Allow Removal of Ice and Sediment—*H. R. Carveth Jr., Lewiston, N. Y.* No. 2,548,701. Apr. 10, 1951.

Process of Continuously Treating Liquid Foods by Preheating in Vacuum, Further Heating at Elevated Temperature and Flash Cooling in Second Vacuum Vessel With Vapors Used for Preheating—*J. A. Cross, Westerville, Ohio, to Mojonnier Bros. Co., Chicago.* No. 2,548,776. Apr. 10, 1951.

Centrifugal Egg Separator Consisting of Rapid Basket Rotation to Break Eggs and Separate Meats From Shells—*W. J. Patterson, La-Grange, Ill., to Swift & Co., Chicago.* No. 2,548,812. Apr. 10, 1951.

Frozen Confection Composition With Improved Body and Texture and Reduced Whipping Time Through Addition of Water-Colloidal Carboxyalkyl Carbohydrate—*L. H. Burt, Philadelphia, to Hercules Powder Co., Wilmington, Del.* No. 2,548,865. Apr. 17, 1951.

Process for Extracting Pectin From Citrus Peel by Passing Dry Strips of Peel Through Oppositely Moving Dilute Aqueous Mineral Acid—*R. A. Graham, Albany, and A. D. Sheperd, El Cerrito, Calif., to U. S. A.* No. 2,548,895. Apr. 17, 1951.

Poultry Scalding Machine Involving Chain Conveying Birds Through Spray Pipe-Lined Chamber With Water Collecting Tank, Filtering Means and Recirculating Pump—*H. E. Drews, Arlington, Va., to Barker Poultry Equipment Co., Ottumwa, Ia.* No. 2,549,070. Apr. 17, 1951.

Continuous Cooker With End-

Want more information on any of these recent patents? If so, you may obtain detailed printed copies by writing direct to the U. S. Patent Office, Washington, D. C., giving serial nmbers of those you want and enclosing 25¢ for each copy.

less Conveyor Submerged in Heated Cooking Fluid With Series of Scrapers on Under Side of Conveyor and Endless Product Submerging Belt Above Conveyor —*G. Ashton, Los Angeles, Calif. No. 2,549,283. Apr. 17, 1951.*

Method of Producing Emmentaler-Type Cheese by Pasteurizing Milk, Cooling, Starting With T. Helveticum at 40-50 deg. C. until 11 deg. Soxhlet-Henkel, Adding Rennet, Cutting, Washing, Pressing Ripening — *S. Orla-Jensen, Copenhagen, Denmark. No. 2,549,331. Apr. 17, 1951.*

Method of Preparing Partially Baked Products by Baking Dough Until Starch Gelatization is Complete But Under Adjusted Conditions Which Prevent External Browning—*J. A. Gregor, Avon Park, Fla., to General Mills, Inc. No. 2,549,595. Apr. 17, 1951.*

Process for Canning Fruits and Vegetables by Adding Sodium Chloride to Can Before Filling and Calcium Chloride After Filling, Closing and Cooking—*W. J. Emmons, Oakland and B. S. Gallagher, Piedmont, Calif. to Salter Machine Co., Oakland. No. 2,549,781. Apr. 24, 1951.*

Process for Separating and Fractionating Sugars by Contacting Solution With Activated Carbon, Displacing Glucose With Water, and Adsorbed Polysaccharides by Eluting With Aqueous Solution of Phenol, Acetic Acid and Ephedrine—*E. M. Montgomery, Peoria Heights and F. B. Weakly, Peoria, Ill., to U. S. A. No. 2,549,840. Apr. 24, 1951.*

Process for Producing Maple Syrup Concentrate by Boiling to 25-50 deg. Above Boiling Point of Water and Holding at This Temperature to Enhance Flavor While Adding Water to Maintain Fixed Boiling Temperature—*C. O. Willets, North Hills and W. L. Porter, Philadelphia, to U. S. A. No. 2,549,877. Apr. 24, 1951.*

Fish-Filleting Machine With Improved Means for Propelling Fish Over Ribbing Knives—*C. M. Savrda, Bay Shore, N. Y., to Fish Machinery Corp., Boston. No. 2,550,025. Apr. 24, 1951.*

Method of Breaking Eggs in Bulk and Separating Meats by Heat Stabilizing Whole Eggs at 136 Deg. F. Without Cooking and Breaking Followed by Centrifuge Separation of Shells and Meats—*O. E. Droege, Glen Ellyn, and C. Hale and P. Schauert, Chicago, Ill., to Swift & Co. No. 2,550,189. Apr. 24, 1951.*

Process for Extracting Antibiotic Material From Fruit Pit of Persea Gratissima and Processes for Preservation of Food Products Using This and Allied Antibiotics—*L. B. Jensen, Chicago, to Swift & Co. Nos. 2,550,253 through 2,550,269. Apr. 24, 1951.*

Process for Clarifying Butterfat by Mingling With Aqueous Acid, Mixing, Gravity Separating and Washing—*C. E. North, Montclair, N. J. No. 2,550,228. Apr. 24, 1951.*

Apparatus for Radio-Frequency Heating and Pasteurizing of Milk Utilizing Cooling Fluid From Oscillator for Preheating—*E. Mittelmann, Chicago. No. 2,550,584. Apr. 24, 1951.*

Method and Apparatus for Freezing Foods By Conveying in Liquid Through Cooling and Freezing Chamber—*J. H. Stansbury, Dillon, S. C., to Stansbury Inc., Baltimore, Md. No. 2,550,615. Apr. 24, 1951.*

Process for Treating Sweetened Whole Fruit for Ice Cream by Combining Gel-Forming Substance With Previously Separated Fruit Juice Syrup and Recombining Until Slight Gel is Formed—*J. W. Knechtges, Chicago, to Swift & Co. No. 2,550,656. Apr. 24, 1951.*

Rendering Cooker With Built-In Product Sampling Arrangement and the Associated Terminating Controls—*C. J. Merriman, Boston and A. P. Huchberger, New York to Consolidated Rendering Co., Boston. No. 2,551,034. May 1, 1951.*

Continuous Rendering Apparatus Comprising Rotary Conveyor Worm and Coacting Mincing Cutters With Discharge Into Steam Injected Heating Chamber —*A. Nyrop, Hellerup, Denmark. No. 2,551,042. May 1, 1951.*

Peach Pitting Machine Including Rotating and Oscillating Knife Holding Pitter Head Movement Integrated With a Continuous Fruit Topping Machine Action—*L. W. Waters, Ontario, Calif., to Atlas Imperial Diesel Engine Co., Oakland. No. 2,551,076. May 1, 1951.*

Dual Roller Track Meat Carcass Conveyor Which Allows Transposing Beef Quarters From Upper Track After Cutting to Lower Track—*E. R. Orling, Detroit, Mich., H. H. Schoenberg, executor. No. 2,551,155. May 1, 1951.*

Filling Machine for Bakery Products Comprising a Pan Conveyor and Intermittently Operated Sequenced Piston-Type Filling Cylinder—*C. W. Clelland, Columbus, Ohio. No. 2,551,419. May 1, 1951.*

Method of Coating Frozen Meat Cuts by Thawing Surface, Applying and Solidifying Coating—*J. M. Ramsbottom, Chicago, to Swift & Co. No. 2,551,463. May 1, 1951.*

Process for Deionizing Defecated Sugar Syrup by Passage Through Beds of Carboxylic Acid Cation Resin Prior to Ion-Exchange System—*J. C. Winters, Lansdowne, Pa., and R. Kunin, Trenton, N. J., to Rohm & Haas Co., Philadelphia. N. 2,551,519. May 1, 1951.* —End

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DOW CORNING ANTIFOAM A

One part per million of Dow Corning Antifoam A kills foam during caustic soda concentration . . .

One part per million kills foam during synthetic varnish resin processing . . .

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And just three parts per million kills foam during strawberry jam concentration.

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Helps Mrs. Tucker's Food Products Open New Sales Territories

A FLEET OF WHITE TRUCKS is helping to spread the name of Mrs. Tucker's Food Products throughout the south and middle west . . . over a wider area than ever before.

A steady supply line from Sherman, Texas, home of this famous line of shortenings, margarines and salad oils, to institutions, food jobbers and warehouses in 12 states, keeps this fleet of Whites on the move . . . rolling up more than 2 million miles a year.

"Our White Payload Tractors keep Mrs. Tucker's products in steady supply everywhere because we can step up our schedules on long trips," according to G. A. Head, plant superintendent. "Our trucks have long trips over all kinds of roads, on tight schedules, and the record of the Whites has been outstanding."

"Dependability is important to us," he says, "and we are backing up that dependability with consistently low maintenance cost and excellent gasoline mileage."

This fleet of Whites is engineered right to the exact needs of this well known company, to achieve the finest kind of transportation service . . . at lowest cost per mile.

Ask your White Representative for facts about the time and cost-saving advantages of Whites for your business.

WHITE FLEET Is Part of Production Line!

MODERN from front door to shipping dock, the efficient Sherman, Texas, plant of Mrs. Tucker's Food Products considers its fleet of Whites an important part of the production line. To spread Mrs. Tucker's name over wider areas, a second plant is being built in Jacksonville, Ill., and the fleet of Whites accelerates delivery service for this 38-year old firm once again.

White

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For more than 50 years the greatest name in trucks

Just Off the Press

New Catalogs and Bulletins
from manufacturers of equipment and supplies
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Food Plant Equipment

Piston Fillers

Pictured and briefly described in 4-page leaflet are filling units for semi-solid foods. Four models are shown with dimensions and applications.—*F. L. Burt Co., 563 Seventh St., San Francisco 3.*

Aseptic Canning System

The development of aseptic canning, its general principles and practical advantages, are outlined in 34-page spiral-bound catalog.—*W. F. & John Barnes Co., 301 S. Water St., Rockford, Ill.*

Deionizer

Featured in Bulletin 512 are high-capacity single tank deionizers of mixed bed, monoflow design said to produce water of extremely high chemical purity. Unit is also reported to replace distillation or evaporation for as little as 1 to 10 percent of cost. —*Elgin Softener Corp., Elgin, Ill.*

Liquid Sugar Storage

Article concerning method of storing sugar in stainless steel equipment appears in 4 page bulletin. Contamination, broken bags and wastes are said to be eliminated and sugar syrup is kept sterile by means of ultraviolet lights in ventilating system.—*Electrometallurgical Co., 30 E. 42nd St., New York 17, N. Y.*

Dough Rounder

Designed for variety breads, heavy-duty rounder, featured in 2-page leaflet, is reported to handle 90 pieces of dough per min. Plan and side view illustrations are included, showing overall height and width as well as bowl diameter and heights to bowl rim and feeder hopper.—*American Machine & Foundry Co., 485 Fifth Ave., New York 17.*

Centrifugal Mixer

High-speed mixer which claims advantages of uniform quality through complete dispersion of product ingredients, lower manufacturing cost, less waste, adaptability to continuous or batch processes, easy installation, and simplified operation is presented in 4-page booklet.—*Entoleter Div., The Safety Car Heating & Lighting Co., Inc., P. O. Box 904, New Haven 4, Conn.*

Colorimeter

For grading of tomato products, Model 402-E colorimeter is dealt with in Bulletin No. 485. 6 pages.—*Photovolt Corp., 95 Madison Ave., New York 16.*

Grain Moisture Chart

A revised conversion chart for employment with the TAG-Heppenstall moisture meter, used to determine moisture content of soft red winter wheat and white wheat grown in eastern areas, is now available.—*Tagliabue Instruments Div., Dept. 67, Western Electrical Instrument Corp., 614 Frelinghuysen Ave., Newark 5, N. J.*

Cold Storage Specification

A new 12-page data and specification booklet advises the proper cold storage doors for various temperature conditions. Reach-in, walk-in, track and vestibule door specifications and dimensions are given.—*Jamison Cold Storage Door Co., Hagerstown, Md.*

Electric Churns

Sales catalog sheets and folders covering data, prices and descriptions of electric churns and jars are included with 2-page leaflet.—*Alabama Mfg. Co., Birmingham 3, Ala.*

Control Equipment

Flow Ratio Controller

Complete systems for proportioning the flow of liquids (gases, liquids and slurries) in two or more lines are detailed in catalog 53 with diagrams, tables and photos. Systems can be tied in with machine speeds, positive displacement meters, metering pumps or dry feeders.—*Fischer & Porter Co., Harboro, Pa.*

Load, Retort Controls

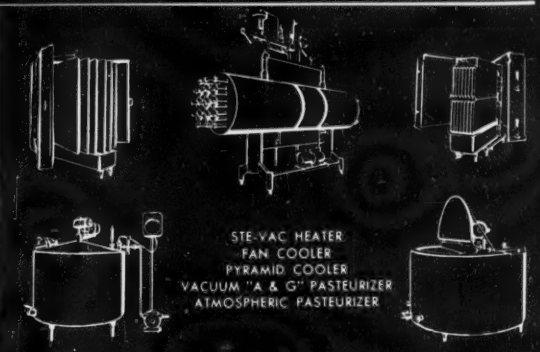
Articles appearing in Vol. 3, No. 3, of *Taylor Technology* include description of new load controller, instrumentation aids for canning industry, liquid level controls, retort controls in chili con carne production, and others. 28 pages.—*Taylor Instrument Cos., Rochester 1, N. Y.*

Adjustable Speed Magnetic Drive

Operating on the slip coupling principle, drive described in 32-page notebook type catalog provides means for securing controllable and adjustable speeds needed for many applications.—*Electric Machinery Mfg. Co., Minneapolis.*

Stainless Steel Joint

Expansion joints used in service involving corrodents such as tertiary amyl-phenol and amylene,



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VACUUM PROCESS VATS

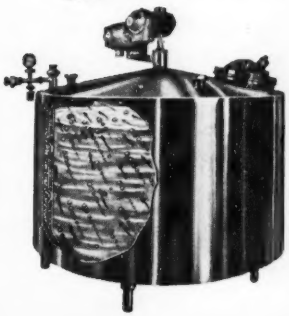
for HEATING • COOKING • COOLING
... UNDER VACUUM

The Chester-Jensen Vacuum Batch Pasteurizer

★ **Off-flavors, volatile odors, and air are removed while heating, holding and cooking.**

★ **Heating or cooling water circulates at high velocity thru the spiral water jacket producing heat transfer throughout the entire side wall and bottom area.**

★ **Correct agitation to insure complete mixing at low speed.**



Full specifications and bulletins gladly furnished on request.

Chester-Jensen Vacuum Batch Pasteurizer

44

Chester-Jensen Company

5th AND TILGHMAN STS. CHESTER, PENNSYLVANIA

✳ *Sweetose* Corn Syrup gives your finished product a definite competitive edge that's important to your sales!

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THE *IMPROVED* CORN SYRUP

A. E. STALEY MFG. CO., DECATUR, ILLINOIS

World's Largest Producer of Corn and Soybean Products

slightly contaminated with sulfuric acid, high concentrations of salt water, and sulfuric acid concentrations are detailed in catalog. Known as Stainless No. 20, joints give maintenance-free service.—*Carpenter Steel Co., Alloy Tube Div., Union, N. J.*

Valves, Gages, Whistles

Information Bulletin 502-E sets forth pressure safety appliances, including safety and relief valves, pressure indicating gages, and whistles and other specialties for steam, air, oil, chemical and hydraulic service. 4 pages.— *H. P. Sherman Co., Inc., 210 Kent Ave., Brooklyn 11, N. Y.*

Heat Transfer Equipment

Condensed 4-page Catalog 10 lists a variety of heat transfer equipment, including blenders and process vessels such as kettles, mixers, autoclaves, etc.—*Patterson Kelly Co., Inc., East Stroudsburg, Pa.*

Materials Handling

Hydraulic Lift Truck

Information on two new hydraulic lift trucks, developed for one-man handling of heavy pallet loads, is contained in Bulletin 5142. Unit is said to be compact and highly maneuverable, and of simple design for single and double-face pallets, and thus is particularly suitable for use as an auxiliary for power trucks.—*Barret-Cravens Co., 4613 Southwestern Blvd., Chicago 9.*

Roller Conveyor

A variety of roller conveyor types, and selection data and diagrams, are listed in 16-page Catalog No. 60. Seven styles of ball bearings rollers are noted, as well as roller mounting specifications, curves, multiple rows, spurs, converging and hinged sections. —*E. W. Buschman Co., Cincinnati 32, Ohio.*

Feeders and Conveyors

Colorful, well-bound Catalog 830 covers a number of electric vibrating feeders and conveyors. Operating instructions and specifications for all types of machines are given. Also included is information on electronic control equipment for conveyors. 84 pages. —*Jeffrey Mfg. Co., Columbus 16, Ohio.*

Bucket Carrier

Description of pivoted bucket carrier designed for moving wet or dry bulk materials appears in Bulletin HB-551. Special design permits use of bucket liners of various materials—stainless steel, Monel, aluminum, plastics, etc. Unit is specially adapted for use with materials such as abrasives, corrosives, and caustics. 4 pages. —*Hapman-Dutton Co., Kalamazoo, Mich.*

Plant Supplies

Rubbish Destructor

Outlined in 18-page catalog is information on industrial incinerators.—*Plibrico Jointless Fire Brick Co., Chicago.*

Asbestos Packings

Recently issued is 8-page bulletin featuring complete line of asbestos and fiber sheet packings consisting of woven asbestos wire, Pyroid, Navy grade, dreadnaught, and other types. Service recommendations, standard sheet sizes, and weights and thicknesses in which each type sheet is available, are included.—*Ravbestos-Manhattan, Inc., Manheim, Pa.*

Creep Stress Data

Technical information concerning equipment operated at elevated temperatures and pressures is presented in new data card. Designated as TDC 102, card gives information on creep for a number of tubing steels.—*The Babcock & Wilcox Tube Co., Beaver Falls, Pa.*

Plastic Rock Flooring

Combination of information on how and where to apply rock flooring, as well as certain technical data about the product itself, is contained in 8-page brochure. Material is said to be particularly advantageous for resurfacing traffic areas subject to heavy traffic, both foot and wheel.—*United Laboratories, Inc., 16801 Euclid Ave., Cleveland 12.*

Vacuum Unit

Literature shows operation, application, and gives description of bell-jar type high-speed pump unit for evacuation.—*Radio Corp. of America, Engineering Products Dept., Camden, N. J.*

Ultraviolet Lamp

Line of high-intensity long wave ultraviolet lamps designed

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Any of these very-latest catalogs, bulletins, or folders will be sped to you gratis. Just note here the specific literature you want, then turn to the Reader Service section inside the back cover, where all items are listed by pages under the heading, "Editorial: New Technical Literature"—each one with a page key number after it. The key numbers also appear on the handy Reader Service postcard. So you circle those for the items desired, sign at the bottom and mail. No postage needed.

for applications in the detection of adulteration, impurities, spoilage and filth in foods, containers and related materials is subject of 2-page leaflet.—*Ultra-Violet Products, Inc., 145 Pasadena Ave., South Pasadena, Calif.*

Steam Purifier

Recommended for installations inside steam drums, flash tanks, evaporators, packed towers, bubble cap towers, deodorizers and stills, internal type purifier, designed to remove 100 percent entrainment from vapor, is described in 4-page bulletin.—*V. D. Anderson Co., 1935 W. 96th St., Cleveland 2.*

Condensate Return Unit

Technical bulletin includes selection tables to enable rapid and accurate selection of vertical condensate return unit to fit specific needs. Equipment is particularly intended for installation where return pipe is close to floor level. Description is well detailed.—*Roy E. Roth Co., 2484 Fourth Ave., Rock Island, Ill.*

Moisture Tester

Described in 2-page leaflet, instrument for moisture control is designed to make 5-min. tests without sacrificing practical accuracy. Conversion charts are available for a variety of products, including asparagus, chicken and vegetables, and compressed yeast.—*Feedburo Equipment Co., 618-626 W. Jackson Blvd., Chicago 6.*

Discharge Piping

Publication proposes an approach to the design of discharge header systems based upon partial or complete elimination of back pressure effects on tied-in safety relief valves. 36 pages.—*Farris Engineering Corp., 516 Commercial Ave., Palisades Park, N. J.*

Interval Timers

Single set timers for either permanent installation or for portable use with cord and plug are pictured and briefly outlined in 2-page leaflet.—*The Tork Clock Co., Inc., Mt. Vernon, N. Y.*

Robot Operator

Offered in 2-page bulletin are three-button remote switches and robot magnet remote control for operating sectional overhead type doors from cars or trucks operated by drivers where cars or trucks are in motion.—*Robot Appliances, Inc., 13165 Prospect Ave., Dearborn, Mich.*

Stuffing Box

Packless stuffing box, described in bulletin, can be used for steam, water, oil, chemicals and gas and is said to be leakproof due to all-metal seal. 2 pages.—*Phillips Rotary Joint Valve Co., Inc., 5711-13 Boulevard, East, West New York, N. J.*

Glass Block

Role of glass block, especially as a replacement for worn-out window sash during material shortages, is outlined in 16-page booklet.—*American Structural Products Co., Toledo 1, Ohio.*

Valves, Gages

Well-bound Catalog 0 lists prices and specifications of various type valves, gages, indicators, and fittings for ammonia and Freon. 40 pages.—*Frick Co., Waynesboro, Pa.*

Miscellaneous

Meaning of pH

Informational leaflet reproduces tables showing the different pH values of common acids and alkalies.—*Allis-Chalmers Mfg. Co., 1113 S. 70th St., Milwaukee.*

Atomic Defense

How to Prepare Your Plant for Atomic Attack is subject of 32-page illustrated booklet on industrial plant security in the atomic age. Presented is information about atomic bomb's destructive potential and limitations, how to organize personnel to cope with possible plant disasters, and recommendations for strengthening plant construction and sustaining production in case of bomb attack.—*Walter Kidde & Co., Inc., Belleville 9, N. J.*

Labels

Colorful 29-page catalog pictures adhesive labels of every description.—*Eveready Label Corp., Belleville, N. J.*

Glass Insulation

Booklet of 24 pages discusses cellular glass insulation, listing its properties, data for cold, intermediate and hot applications, details for insulating tanks, ducts, removable covers and tank heads, etc.—*Pittsburgh-Corning Corp., 307 Fourth Ave., Pittsburgh 22.*

Controlled Materials Plan

Research information contained in manual shows ways to save on clerical routines and how to meet requirements under the Controlled Materials Plan.—*Remington-Rand Co., 315 Fourth Ave., New York 10, N. Y.*

Instrumentation Film

Entitled *Information at Work*, motion picture film portrays growth and importance of instrumentation in process industries. Film may be borrowed without cost.—*Taylor Instrument Cos., 95 Ames St., Rochester 1, N. Y.*

Centralized Lubrication

Four keys to increased production and lower operating expense highlight the 1951 issue of *Studies in Centralized Lubrication*. Keys are described as production time-saving, manpower-saving, lubricant-saving and bearing-saving.—*The Farval Co., Cleveland 4.*

—*End*

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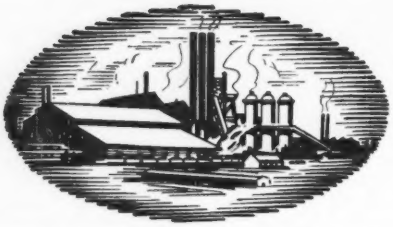

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Additional Position Vacant Ads on the opposite page

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(Continued on page 229)

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(Continued from page 227)

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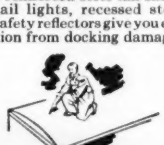

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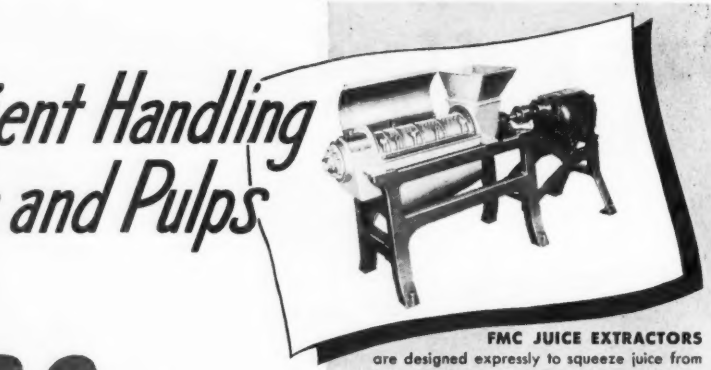
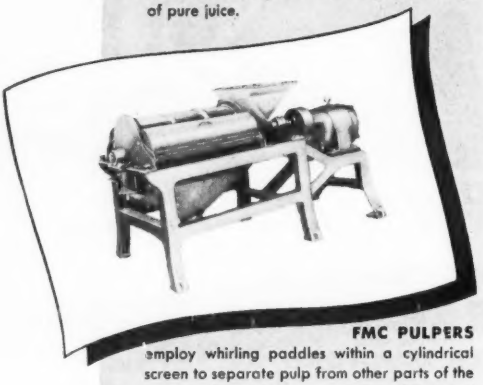
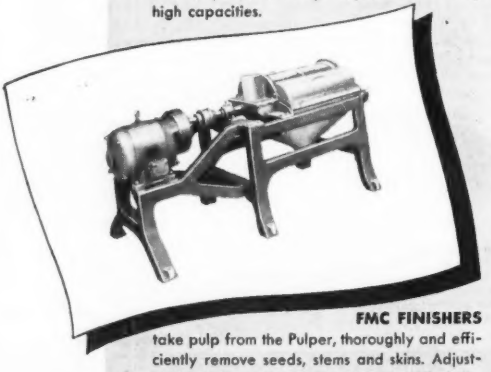
- PULPERS
- FINISHERS



FMC JUICE EXTRACTORS are designed expressly to squeeze juice from fruits and vegetables. Extra long screw provides for drainage of the last possible drops of pure juice.



FMC PULPERS employ whirling paddles within a cylindrical screen to separate pulp from other parts of the product. Ruggedly constructed paddles and screens permit thorough separation at very high capacities.



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Products and literature in this issue are listed on these pages. There are two indexes: (1) editorial items on new equipment, new plant and packaging supplies, new literature; and (2) products advertised.

WHAT THE NUMBERS MEAN

Editorial Items: Numbers on postcard correspond with those in the index below.

Advertisements: There is a page number on the postcard for each advertisement. Before the number may appear, L, R, T, B (left, right, top, bottom) locating the ad on the page; small letters following (a, b, c) indicate additional products in the advertisement.

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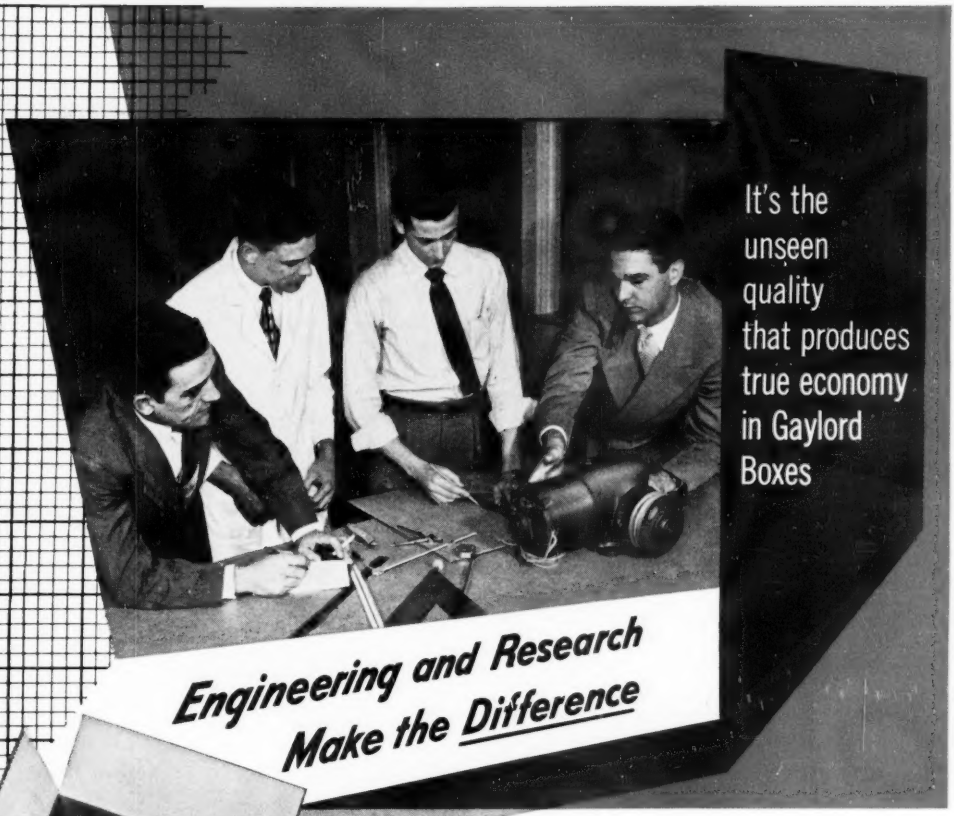

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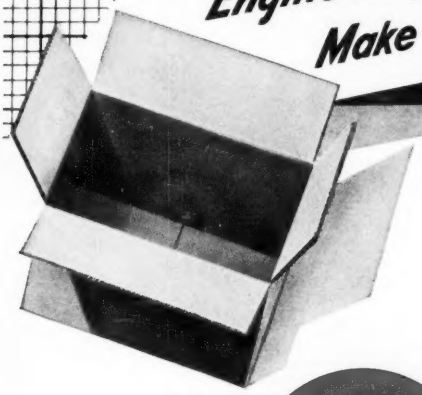

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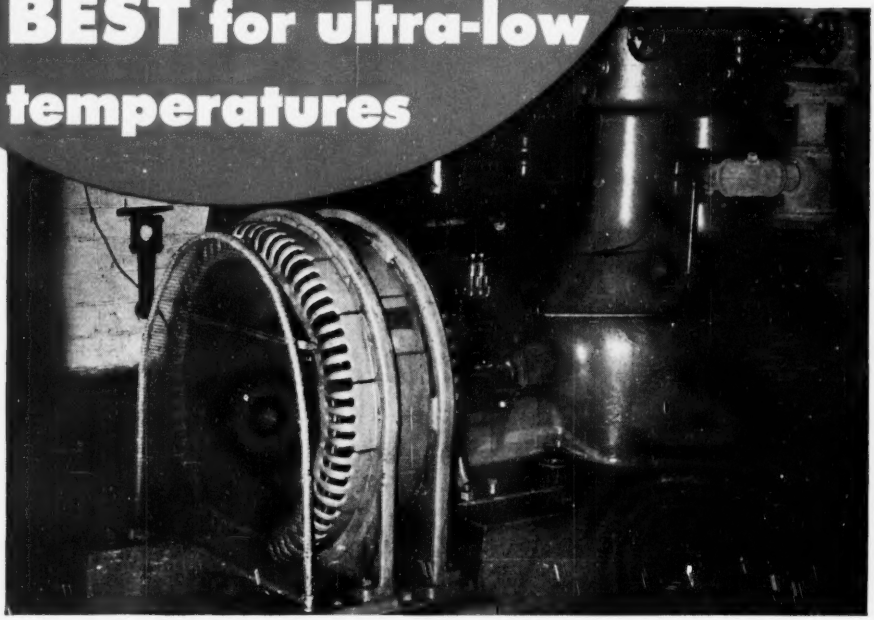

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